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POTTERY IN THE MAKING



Frontispiece

By permission of the Victoria and Albert Museum

PLATE 1. Drug-vase, enameled earthenware, painted in blackish blue
outlined in manganese purple
Italian (Florence); middle of fifteenth century

POTTERY IN THE MAKING

A HANDBOOK FOR TEACHERS AND INDIVIDUAL WORKERS

By DORA LUNN

A.R.C.A. (*Design*) ~~London~~

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Froebel Educational Institute,
Rochampton

5676

With a Foreword

by P. B. BALLARD, M.A., D.Lit. (*London*)

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FOREWORD

THE writer of this book is a potter, and the daughter of a potter. She has pottery in the blood. Her father, the late Mr. Richard Lunn, practised the craft, wrote a book upon it, and taught it for many years at the Royal College of Art. Following in her father's footsteps Miss Lunn mastered the art of pottery first, and taught it afterwards. For a considerable time she conducted in Ravenscourt Park a flourishing business, where pottery was made by hand and sold on the premises. In fact, the Ravenscourt Pottery, which is so well known and so highly prized in artistic circles, is wholly the product of her own brain, and largely the product of her own hands. Then again, she has had much experience in teaching, not only at her own workshop but at the Froebel Educational Institute. She has taught children, and she has taught the teachers of children.

It will thus be seen that Miss Lunn's equipment for the task of writing this book is exceptional. She knows the two essential things; she knows how to make pots and she knows how to teach the making of pots. And it is the scarcity of this dual qualification, not only in pottery but in every other specific craft, that has been the main obstacle in the development of handicraft in our schools. Good potters are rare; good potters who are skilled in the art of teaching are rarer still. The main purpose of this book is to increase their number.

There no longer exists in the educational world any doubt at all as to the cultural value of handicraft; nor any doubt as to the validity of its claim for a place in every school that aims at a liberal

education. But considerable doubt remained on two points. What sort of handicraft should be taught? And what sort of teachers should teach it? For nearly half a century the schools have been trying to answer these questions. And although there is no clear answer to either, there is yet observable in all schools a tendency to abandon the casual type of handwork which leads nowhere, and to adopt one or more crafts which have a tradition behind them and which are actually practised in the outside world; crafts, in fact, whose roots lie in the primary needs of the human race. There is, moreover, a tendency to demand a better equipment on the part of the teacher. We no longer believe in the born teacher who can teach anything and everything. We have ceased to tolerate the fantastic theory that in attacking a new craft teacher and taught should start level—start at scratch.

The only forms of school handicrafts which have been immune from criticism are those which are taught in a properly equipped room by a properly qualified teacher, crafts such as woodwork, metalwork, cookery and laundry; and it is being increasingly believed that the more nearly the handicrafts carried out in the classroom or practical workroom approach that ideal the more successful are they likely to be. It follows that the ordinary teacher should not be allowed to teach such a craft as pottery until he has taken the trouble to qualify himself for the task.

As a craft for schools pottery is specially suitable. Children like working in clay; and although they have no objection to modelling it into apples or bananas, they prefer making cups and saucers, pots and jugs, and other articles that they can keep and use. They are then interested not merely in the process but in the product as well. But the development of pottery as a school pursuit has been hindered by the difficulty of firing. To mould the clay into the requisite shapes, whether by coiling it, by modelling it with the hands, or by using the potter's wheel, is a comparatively simple matter; but to get the products well fired in a kiln is distinctly

difficult. Miss Lunn says (p. 47) that each school should possess its own kiln. Quite true; but for most schools the price of the kiln is so high as to be prohibitive. Miss Lunn's next sentence, however, points a way out of the difficulty. She says, "Something might be done if several schools in a town joined in using one kiln." That, in fact, is the way the problem is being solved in the schools of the London County Council. Given the facilities for baking and glazing, the craft becomes very popular with the children. It is easy enough to enable the beginner to make something that engages his interest; it is difficult enough to tax the powers of the most ambitious student. All of which is obvious to the readers of this book.

I commend this little book to all who are concerned with school handicrafts or with home industries. May it prosper in its mission of helpfulness. May it kindle interest as well as afford instruction in a craft which is as fascinating as it is useful.

P. B. BALLARD.

EXPLANATION

This book is primarily intended for beginners. It is therefore purposely written in a clear and simple manner. The educational side of handwork has been borne in mind to meet the need that is arising in schools today.

Some of the books I have consulted are mentioned at the end of the book.

I wish to thank the authorities of the British Museum and the Victoria and Albert Museum for permission to reproduce photographs, and Mr. Braunnholtz of the British Museum and the Royal Anthropological Institute, for kind permission to use their photographs of native potters at work.

I also wish to thank the many friends who have helped me in the study of pottery and so brought a subject of unending interest into my life.

D.L.

CHAPTER I

HISTORICAL SURVEY

"History unites the past with the present, and makes the ancient world and the modern world one."

E. LAWRENCE

History gives no record of the making of the first pot. Ideas about the making of early pottery are therefore based partly on conjecture and partly upon observations made of the native workers of today. Basket-weaving probably came before pottery-making and it is likely that clay was first used to make baskets watertight.

It may have been noticed that after rain the water which collected in the impression made by a footprint in clay soil did not disappear as quickly as it did upon ordinary earth. This may have suggested to primitive man the use of clay as a lining for his baskets to make them hold water.

A basket was used as a mould in which to coil or press clay, and many early pots show the impression of the basket upon them.

One day the basket may have caught fire and so led to the discovery that whereas the basket perished in the flames, the clay lining was made more durable and hardened by the fire into a vessel needing no basket for its support.

The mud-walled houses in the East, the "wattle and daub" of many native kraals, show that hardened earth or clay has been used from very early times. It is possible that clay was first used for the walls of houses, or its use may have originated simultaneously in different forms in various parts of the world.

BABYLON

One of the first mentions of the use of clay seems to have been

the building of the Tower of Babel, or the astronomers' towers in Babylon.

In Genesis xi, 3, we read: "And they said one to another, Go to, let us make brick, and burn them thoroughly," a passage which points to the fact that the knowledge of how to burn bricks thoroughly existed in those days too, even amid the mud-built houses of the East.

Another point of interest in those days of long ago was the baked clay slab, or cylinder upon which records of various kinds were kept. Plate 2 (page 13) gives part of the Babylonian record of the Creation.

It is astounding to our modern minds to be told that the civilisation of Babylon was at its zenith about 4,000 years before Christ, but when we see reproductions of the wonderful enamelled brick reliefs, wrought out in marvellous modelling and colours, we become more reconciled to the statement.

The modelling in relief of animals such as the bull, the lion, etc., is of a high order, expressing much virility. The tiles show great height of attainment in ceramics, for when discovered they were as fresh and unspoiled as if they had been taken straight from the kiln.

CHALDEA

The recent excavations from Ur of the Chaldees show pottery of 4,000 years before Christ.

A primitive potter's wheel came to light and also a number of well-shaped pots of the periods before and after the Flood. The pottery made before the Flood was painted and highly decorated, whilst that of the period following the Flood was found to be of simple shape and decoration. In another part a small glazed pot was found which was thought to be the earliest discovery of glazed work.

ASSYRIA

Whole libraries of baked clay cylinders and other shapes are to be found in Assyria emerging from the ancient kilns, as today books come forth from the printing press. History is grateful to

these true records preserved across the flight of years and admitting of no errors. Histories, title-deeds, poems, letters, etc., are all as faithful records today as when originally written.

Many people do not class bricks and slabs under the heading of pottery, but it is interesting both to make them in the pottery class and also to trace their connection with the history lesson.

Pottery for domestic purposes was being made at the same time for the storage of wine.

E G Y P T

Among the interesting find of excavators in Egypt are the sun-dried bricks made by the Children of Israel, and also a fund of information on Egyptian pottery.

On the walls of the tomb of Beni Hassan is depicted the potter at work at the wheel and firing by an early method, all of great interest as showing something of the life of those times.

Pottery vessels of various shapes were made, mostly from a buff-coloured clay, and were used for food, for ointment and for embalming. There were also small models of figures representing the servants of a departed lord, that were buried with him and that showed a further development in glazed ware. These were glazed in a wonderful turquoise glaze, the body made of especially white paste, so that the colour lost none of its purity and brilliancy.

Very large pots were also made in buff clay. It is easy to imagine Pharaoh's chief butler keeping stores of wine in such vases and the chief baker might have found them equally useful for his "bakemeats".

G R E E C E

Some authorities think that Greek pottery found its origin in Egypt and Mesopotamia, but recent excavations point to the fact that an early and highly developed form of pottery existed in Greece about 1100 B.C. It is also known that Greek potters settled in Egypt centuries before the Christian era, and had potteries at Nancratis, Bubastis and Tanis. The prehistoric ware from Cyprus and Crete is good to study, both for form and design, purely geometric types, with quaint birds and animals, being introduced

which suggest ideas along which students' work could be developed. Many fine examples exist in the British Museum.

As Greek pottery developed, the body of the pot became finer and more technically perfect, but the shapes became more suitable to vessels made of metal and no longer so fine in form from a potter's point of view.

The decorating of these vases, however, was highly skilled work. Figures in black, painted upon red ground or *vice versa*, depicting old myths or portraying the life and customs of the times, are of historic value today.

Besides the painted figure-work on vases were beautifully modelled figurines supposed to have been used as household ornaments. They are known as the Tanagra figures because they were found at Tanagra in Greece. They are another proof of the high state of Grecian civilisation about the fourth and third centuries B.C.

Roman pottery seems to have been to a large extent an offshoot of the Greek. Some Greeks settled in Italy bringing early Greek civilisation with them and retained their power for many years, influencing the art of Italy. The Romans never carried the art to as great a finish in the preparation of the body of the pot, but their shapes, however, were good, and pots are to be found wherever Roman armies went. In England many have been unearthed and are preserved in the museums.

Countless pottery lamps were made for homes, festivals and triumphal occasions, and many stately villas were built whose mosaic floors are still to be found amid the ruins of bygone days.

The Roman black pottery, the result of a chemical action of the smoke when firing upon the red oxide of iron in the clay, is still made in England today, on the same spot where centuries ago the Romans themselves made it.

At Aretium in Italy they made the famous rich red glazed ware known as the "Samian" whose thin glaze, once a mystery to potters, is now supposed to have been achieved by covering the body of the pot with borax.

As the Roman pottery improved in refinement, simple shapes were still in evidence, but slip decoration was added.

In 1299 the Italians acquired the knowledge of painting and more extensive glazing of pottery from the Arabs who had settled in the Isle of Majorca, one of the Balearic Islands off the coast of Spain. They set up their first pottery to make this ware at Faenza in Romagna, Italy, and gave the ware the name of majolica, which reached its greatest perfection between 1530 and 1560.

THE ARABS AND MOORS

The potter's art, therefore, which seems to have emanated from the "cradle of the world" near the river Euphrates, flowed westward over Arabia, Egypt and Morocco and thence to Spain, Majorca and Italy.

The Arabs and the Moors took with them their wonderful glazed and decorated pottery and lustres into Spain in the thirteenth century. The Alhambra is supposed to have been built not only by the Moors but by Persian workers, who formed a small colony in Spain at that time.

The knowledge of pottery continued to develop from the south of Europe as far as England, in most cases finding somewhat crudely made pottery where it went, and uniting with the existing knowledge to the betterment of the craft.

We find developments at the same time in Persia, India, China and Peru—too much, in fact, to deal with even briefly in this short account.

PERSIA

Eastward to Persia. Many fine pieces of Persian pottery are preserved in museums today. They are made of buff-coloured clay over which a coating of finely ground flint has been laid in order to give the paints and glazes the full brilliancy of colour which would otherwise be lost by sinking into the buff-coloured clay.

Much of the beauty lies in the decoration and the fact that the shapes are so suited to pottery.

There are some fine pieces in black designs with turquoise-coloured glaze, and also lustred pieces rich in Oriental splendour.

The Persian mosques and palaces are very wonderful in the refinement of their architecture, with their gay encaustic tiles and mosaics. One traveller writes: "The sight of wonder is, when travelling over the plains of Persia or India, suddenly to come upon an encaustic-tiled mosque. It is coloured all over in yellow, green, blue and other hues; and as a distant view is caught of it, at sunrise, its stately domes and glittering minarets seem made of purest gold . . . a fairy-like apparition of inexpressible grace and most enchanting splendour."*

C H I N A

Chinese pottery dates back to prehistoric times. From excavations of pottery, in some cases dating back to 2205 B.C., two distinct types come to light, a red ware with black painted ornament and a coarser greyish ware with matting patterns and scratched ornament.

In China, as in Egypt, models of friends, servants, animals and implements were buried with the dead; many of these still exist in museums today, reflecting something of the social life of those early times.

The stoneware of China with its wonderful glazes is world-famous and upon it modern potters base their ceramic study.

Later on the discovery of porcelain (from Latin *porcella*=a cowrie shell; *porcella* being a diminutive of *porcus*=a hog [pork]) introduced a new and wonderful white ware "surpassing the hoarfrost in whiteness".

Space will not permit a further survey. A study of European and British pottery will prove of value, although to the young student the pottery of the East offers more scope for inspiration, being less fettered by machinery and more purely a craft.

Peasant pottery is always interesting, being full of life and vigour. Some of the English slip ware of Toft retains that freshness good for students to see in their early stages.

*Sir George Birdwood: *Industrial Arts of India*, page 140.

After having studied these simple attempts, the modern potter will find endless interest and food for thought in the stoneware of China and Japan.

Regarding the modern renaissance of the potter's craft, it is interesting to see how far-reaching are its effects not only upon the factories but also upon the modern theories of craft education.

CHAPTER II

CLAY

"It is most necessary for every reason to have potters (on a farm) since we are convinced that it is possible to find potter's clay on any land; for either on the surface, or deep down, or in out-of-the-way places on the land you will find earth suitable for making pottery."

GEOPONICA,* II, 49

Clay being the necessary material from which all pottery is made it is essential to know something of its composition and requirements, and also of its preparation, and of the care of clay whilst in use.

Clay is the result of the decomposition of the felspathic rocks which form part of the earth's crust. The formation of clay is an interesting subject but too extensive to be dealt with in this small textbook. Books of reference which deal more fully with the subject are given under Bibliography at the end of the book. In a school this would be taken under physical geography. It is well to connect up the subjects into one whole when teaching children, but after merely linking up the origin of clay with this class, we must pass on to the practical points arising purely and simply within the pottery class.

BALL CLAY

The clay requiring the least preparation for use is the *Ball Clay* which is quarried in Dorset and Devon, and Hampshire. It is found above the chalk layers in the Tertiary bed of deposit.

CHINA CLAY

China Clay, Cornish Clay or Kaolin (from Kao-ling, a hill in China where a quantity was found) forms the main part of the

**Geoponica*, a Greek treatise on agriculture.

body of porcelain. Felspar has to be added to make it more fusible.

CHINA STONE

China Stone or Cornish Stone, also largely used in porcelain to give it translucency, imparts hardness and density to China Clays. It is quarried in Cornwall.

FLINT

Flint is largely used in earthenware to impart strength. It is used in powder form and obtained from the flint stones found on the shores of the English Channel. These have to be burnt or caloric, and whilst still hot they are raked out of the furnace and have water thrown over them which shatters them. The fragments are then ground to a powder by machinery.

FELSPAR

Felspar is used as a fluxing material for clays, rendering them more translucent. The ware known as Parian is chiefly composed of felspar with enough clay added for working purposes. Much of it is imported from Norway and Sweden.

FIRECLAY

Fireclay is the name given to a soft rock found in association with coal. This rock requires considerable force to crush it, but when crushed and mixed with water becomes plastic. It shows no signs of fusion up to 1580° C. and is therefore suitable for furnace-linings, brick-making, sanitary ware, etc.

CLAYS FOR THE SCHOOL

It has been found useful to have two coloured clays in a pottery class:

(1) *A Creamy White Clay* such as that used for making jam-jars, hot-water bottles, etc., which may either be obtained from a clay merchant or from a local pottery.

(2) *A Red or Buff Clay* which can be obtained in the same way, although many schools are happy in finding it close at hand, either in their playing field, or in some field near-by.

The red or buff colour is due to the presence of iron. In several instances this clay, when free from grit, may be used directly for the making of rough pottery, just as it was in the Bronze Age, but it is usually more satisfactory to wash the clay before use, and so free it from any stones or impurities which might explode and thus cause damage when the pot is fired.

This applies to all unwashed clay that has not previously been washed by clay merchants.

WASHING CLAY

After breaking the clay into small pieces, soak it in a bucket, just covering it with water. Leave it soaking for a few hours (the longer the better) and then either knead it, or stir it up, and pass it through a No. 40 sieve into another bucket. (These sieves are made of bronze lawn in order not to rust, and may be obtained from any firm which supplies potters' requirements. No. 40=40 squares to 1 square inch. An ordinary strong brush for cleaning saucepans may be used to brush the clay through the sieve.)

SLIP

When clay has been strained through a sieve, and is smooth and liquid like cream, it is called "slip", and is useful for several purposes.

In the case where the clay is merely being cleansed from impurities it is now necessary to extract some of the moisture, and so make it in a fit condition for being shaped into a pot.

PLASTER SLAB

A very convenient possession for this purpose is a large plaster slab, not less than $2\frac{1}{2}$ in. in thickness. This can be made of ordinary plaster which, when thoroughly dry, is porous and so extracts sufficient moisture from the slip to make it fit for modelling. *The plaster slab needs to be re-dried in between use.* It is good to keep it near a stove or hot-water pipes, and when in use to raise it on supports in order to allow air to circulate underneath. (The method of making the slab is dealt with at the end of the chapter.)

STORAGE OF CLAY

The storage of the main bulk of the clay is of utmost importance. The ordinary dust-bin makes quite a good clay-bin if much clay is needed. If only a small quantity, a large biscuit tin (which has previously been painted both inside and out, to prevent rust) is another useful piece of equipment for the class. The white and red clay should be kept in separate bins. In both cases line the bin with a closely woven sack, or something equivalent, which has been moistened before the clay is put in, another damp sack being needed to cover over the clay before putting on the lid.

In summer time, or if the pottery room is very warm, all the clay, including the work in process of being made, needs constant watching and attention to prevent it from becoming hard.

A third bin will be found useful for dry bits of clay or broken pots (unfired) from which slip can be made, for it is good that the student should be taught to recover this dried clay and make it plastic for use, so that nothing is wasted. This may be done either by the method described in "washing clay", or where the pieces of clay are absolutely clean, they may be tied up in a large-sized piece of sack or cloth, and immersed for a short while in a bucket of water. It is well to take the bundle of pieces out of the bucket directly they are well soaked. They are then just in right condition to be beaten up into a compact block by the process known as "wedging".

WEDGING

Before using any clay it needs to be well beaten, that no airholes are left within the mass, and that the whole lump is of the same consistency throughout.

Different nations have differing ways of doing this. In the East and in Spain it is customary to tread the clay with the feet, on the floor of the potter's shed. This was the practice centuries ago, as we read in Isaiah xli, 25—"and as the potter treadeth clay".

Afterwards it is kneaded and divided into pieces ready for the man who is working at the potter's wheel.

In England it is done in the following way:

The wedging table needs to be strong and firm in order to be

immoveable during the process. A large lump of clay is taken, raised above the head and then banged on the table in the endeavour to close up any airholes that may be in it. A wire cutter (similar to a cheese cutter) is used to cut through the lump, when it is seen by examining the section whether air holes remain. By passing the fingers across the section the potter can feel any harder lumps of clay. He then places half the section on top of the other half and repeats the banging, until the whole mass is compact and free from airholes and of the same even consistency.

MOISTENING SLIGHTLY HARD CLAY

(1) Should the clay have become too hard for use, and yet not really dry, it can be moistened by making deep furrows in it by beating it with a small iron bar and sprinkling with water, then wedging into a solid lump, and repeating this process several times.

(2) Another way is to cut it in slices with the wire cutter, moisten with water between each layer, and wrap in a damp cloth, laying it aside in the clay bin for a short while until the moisture has permeated the lump.

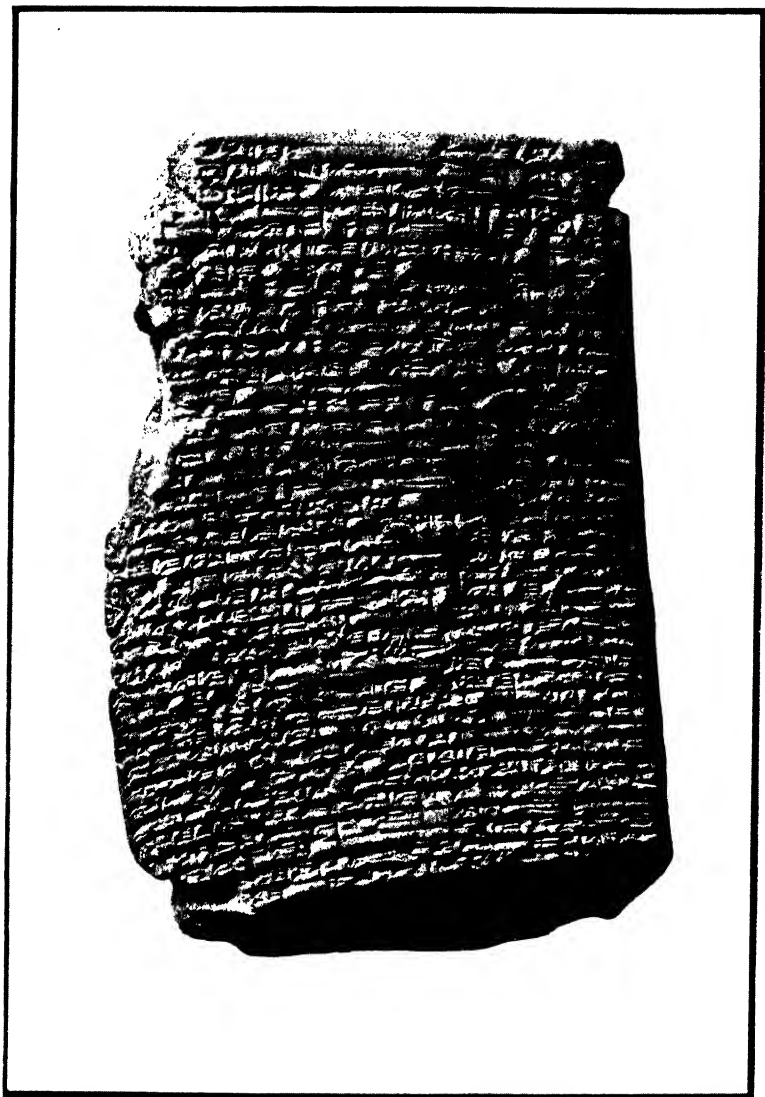
CARE OF WORK

Care must be taken of the work of the class in between lessons. A "damp box" is required for this purpose. Where possible it is good for each student to have a damp box, and for this purpose a large-sized biscuit tin with a tightly fitting lid serves the purpose quite well. In dry weather the work will also need to be covered with a damp cloth.

Where one large damp-box has to be used by several students an old tin-lined ammunition box is found very useful for this purpose. A communal one has also been made by piling several tins upon their sides, without lids, and using damp sacking as a curtain hanging down in front of them all, care being taken to keep the sacking continually damp. (Wherever tins are used it is necessary to paint inside and out with a coat of paint to prevent rust.)

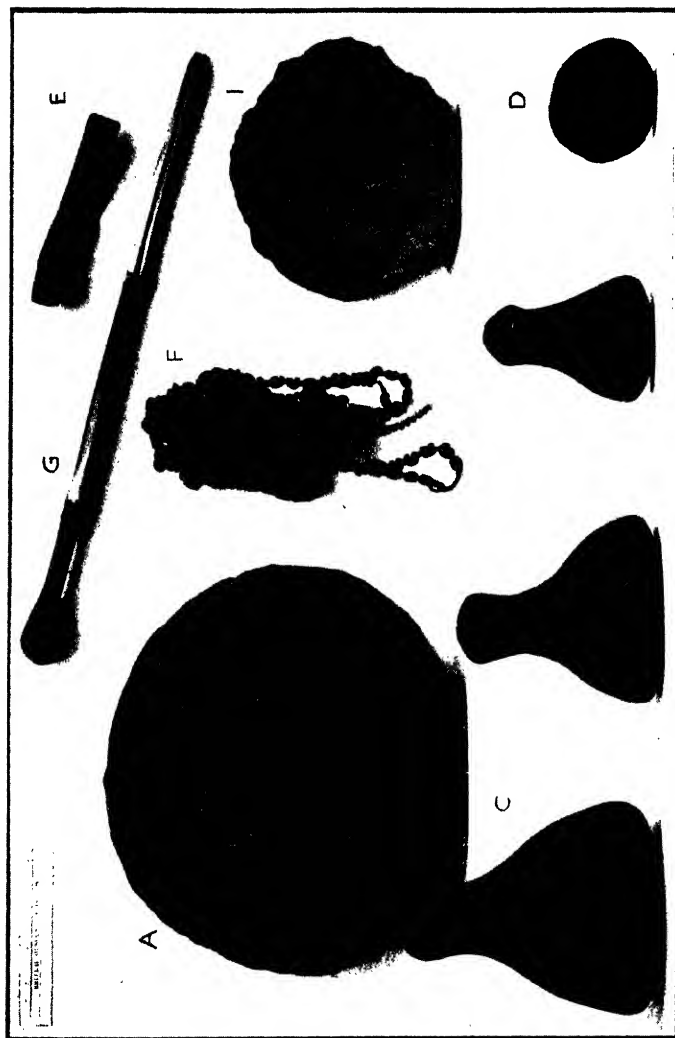
TO MAKE A PLASTER SLAB

Plaster for this purpose need not be so fine as that used for



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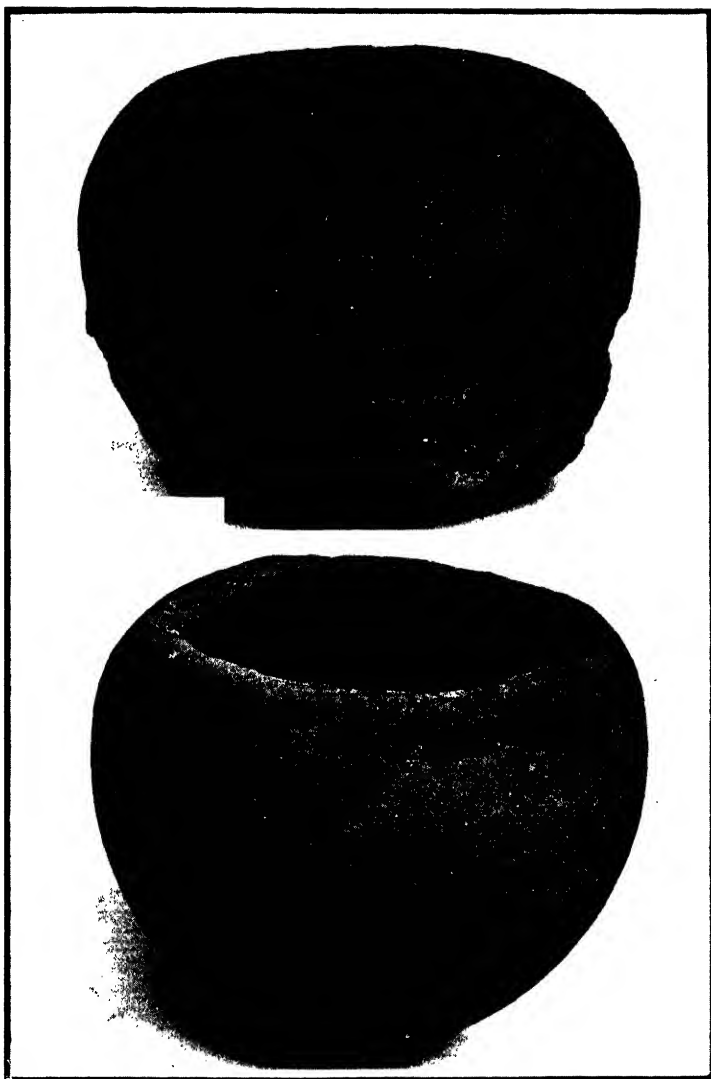
PLATE 2. Text of the second tablet of the Babylonian
story of the Creation



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PLATE 3. Implements for handmade pottery from Northern Nigeria

B

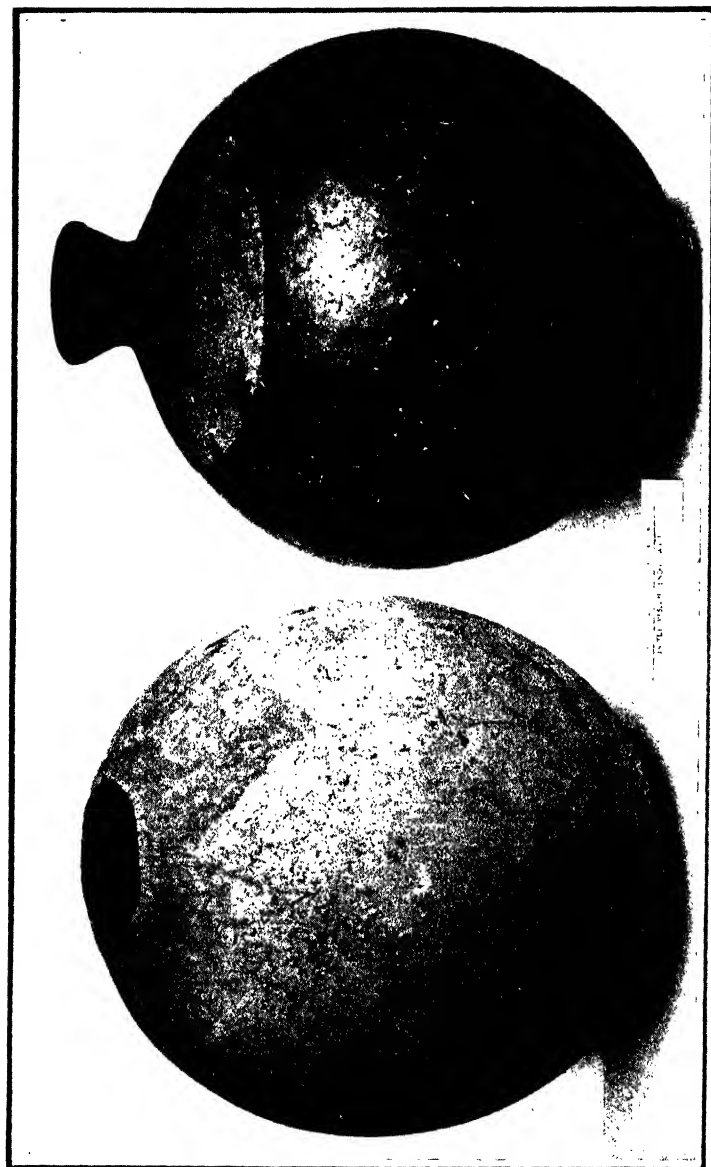


By permission of the British Museum

PLATE 4. Handmade pottery from Northern Nigeria

Above: Clay mould (B)

Below: One of the first stages in making the pot



By permission of the British Museum

PLATE 5. Handmade pottery from Northern Nigeria
The complete pot, showing the last two stages

mould-making. It can be purchased from any local shop where builders' requisites are sold. It is well to buy two bags of this and also to have a cardboard dress-box ready to serve as a mould. A large basin will be required, a spoon and a tin or small bucket with holes round the edge which is described more fully at the end of the chapter. It is very necessary to have all ready before mixing the plaster as it sets quickly and so allows one no time to stop during the process of making the slab.

Fill a large basin three-quarters full of water, take handfuls of plaster and sprinkle it in the water as quickly and evenly as possible, allowing it to sift through the fingers so that no lumps of plaster be allowed to go into the water. Do this as quickly as possible, and when the plaster begins to appear above the surface of the water, it is a sign that enough plaster has been added to the water. Stir well, but be careful not to make bubbles, as these would cause airholes in the slab. Should bubbles arise, they can be burst by blowing them.

When well stirred, pour into the dress-box until full. In a few minutes the plaster will have set and when sufficiently hard to handle without damage, tear off the cardboard box, bevel the edges with an old knife, and leave in a warm place to dry. When thoroughly dry it will be ready for use.

Note. The tin or bucket which is necessary when using plaster, has to have a row of holes made about three-quarters way up near the rim. As any plaster poured directly down the sink or drain would gradually cause a stoppage, it is necessary to pour any surplus plaster (or the washings of the basins, etc.) into this specially prepared tin or bucket. The plaster sediment then sinks to the bottom whilst the water is drained off through the holes made for that purpose, near the rim of the bucket.

CHAPTER III

HANDMADE POTTERY

"Everyone, from the King's son downwards, should learn to do something finely and thoroughly with his hands."

RUSKIN

Pottery as a school craft teaches above all things the necessity of starting with first principles.

As pottery is a true craft, it must be based on sincerity of construction, and the student needs quietly to master the simple truths for which it stands.

It is therefore best to take first the pottery that is made entirely by hand. This not only provides opportunity for becoming thoroughly acquainted with the nature of clay, but also allows the student to become more sensitive in handling shapes.

Having acquired a sensitive touch the potter is then able to express fine thoughts through the medium of clay, for all work starts with a thought and remains a thought expressed, only using the material as a means of expression.

As the hands are the tools through which this expression of thought is externalised, so they must needs become the willing servants of the mind and thoroughly acquainted with the medium of expression, *i.e.* the manipulation of the clay.

In following this study of the earliest and simplest ways of making pottery by hand, it is interesting to both teacher and student to go back in thought to such times as the Bronze Age. Much useful information may be obtained from museums, and also through studying the work of native peoples who are living today, with their crafts as yet unspoiled by machinery.

It is thought that weaving originated before pottery-making, although there is no historic record of such a fact. It is also believed that, in making his baskets from long pliable branches of willows, the basket-weaver, thinking in terms of basketry, made his clay rolls of similar shapes and lengths, and coiled them round inside his basket, pressing them together with his fingers against the basket to prevent leakages, thus making quite a compact lining of clay.

MAKING THE ROLLS OF CLAY

In order to follow this procedure, some well-prepared clay is needed and a very smooth table, board, or piece of linoleum on which to roll the clay. A gentle but firm pressure must be brought to bear upon the clay at this stage of the making, using the palms of the hands rather than the fingers. If the roll becomes too flat it is a sign of too great pressure being used, and the roll must have no cracks or crevices, as these form dangerous airholes in the finished pot which might explode in the firing if enclosed within the structure of the pot itself. The advantage of building up the pot from rolls of clay is that by this method an even thickness may be obtained throughout. It is advisable to have the rolls of clay needed for the pot ready before beginning to coil it into the base, also a damp sponge on which to moisten the fingers from time to time.

MAKING THE BASE

Take up one of the rolls and draw the damp sponge down it in order to prevent it cracking as you coil it. Ease round the end of the coil gently, working it with the fingers as the roll is coiled. In order that no cracks be allowed to develop on the far edge, or any airholes left in between the coils, press the coils together as tightly as possible. It is well to place the base on a small board upon which a piece of strong paper has been placed. This prevents the clay base from sticking to the board as the work proceeds.

Coiled pots may either be smooth with a primitive pattern subsequently added, or the coils may be left untouched on the outside for decoration.

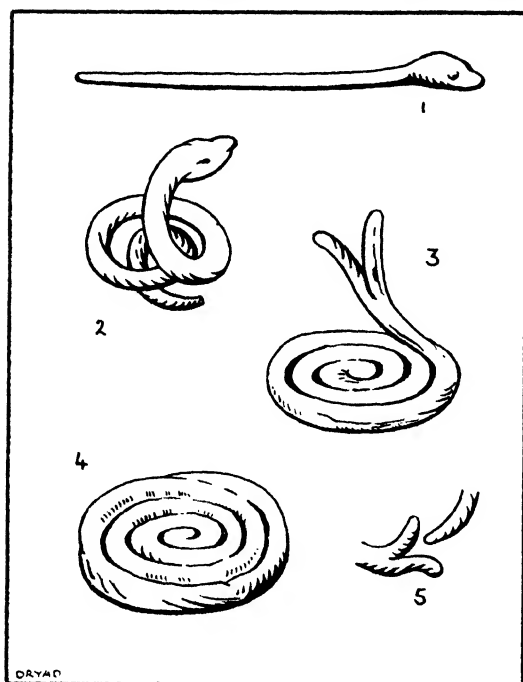


FIG. I. Clay Rolls

1. Roll of clay with modelled snake's head
2. Snake coiled up 3. Orderly coil
4. Coiled for teapot stand or base of pot
5. One method of joining roll

A pattern may be incorporated through pressing the coils together in places with a modelling tool. (It is essential for strength and durability that one side at least should be welded together. When the welding is done it should commence with the base and all the lower part be done before the side rises too high to make it inaccessible.)

WELDING

With the fingers or thumbs so mould the base as to press

the clay together, and in working it fill in all cracks and crevices until a smooth and well-compacted surface is obtained. Turn the base over and do the other side if needed. Before beginning to build up the side make some blunt indentations with a modelling tool round the top edge of the base over which the coil for the sides will be placed, taking care to moisten this top edge before proceeding to place another roll over it and press down the coil of clay. To join one roll of clay to another, split the end of one and taper the other, moisten and model in together as in Fig. I. On

the side where the coils are used as decoration they are strengthened by brushing a little slip in between the edges.

Where the pot is smoothed on both sides, and a pattern is intended to adorn the surface, it is necessary to adopt a simple style suitable to a hand-made pot. This is dealt with in the chapter on Decoration.

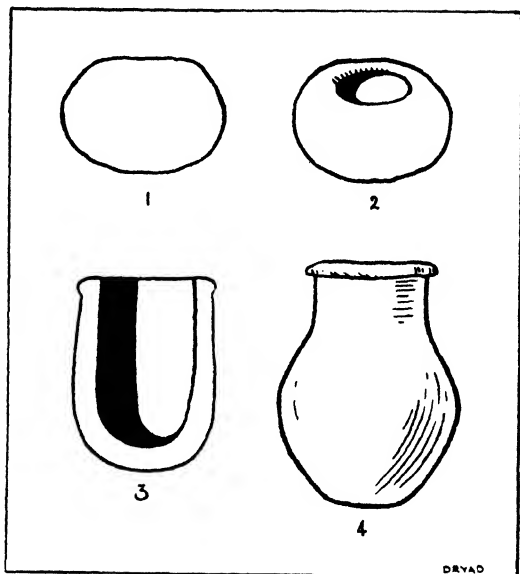


FIG. II. Stages in a modelled pot

The method of building up shapes with coils of clay is suitable to all ages of children. Quite small children of four or five can roll out snakes in clay and coil them, making the head a little thicker than the tail, or they can turn them into snails, teapot stands, or other small articles.

MODELLED POT

Another and perhaps simpler way of making a pot by hand is started in this way: Take a lump of well wedged clay about the size of a tennis ball (Fig. II). Work the clay into as perfect a sphere as possible. Moisten the thumb in water, and press it into the centre of the ball taking care to leave sufficient thickness of clay to form the base of the pot. Work the ball round in the hands always keeping the thumb inside and pressing the clay evenly between the thumb and fingers. It will be found that the rim of the pot has a tendency to crack from the first moment when the

thumb is inserted into the lump of clay. This must be carefully watched and incipient cracks smoothed over, thus keeping a smooth even edge all the while. As the work proceeds the clay is modelled into whatever shape may be required. Although it is necessary that the student should learn to control and manipulate the shape into forms which he has studied in the art class, there is yet something to be said for taking advantage of what a chance twist will reveal and seizing upon a good shape when it has appeared out of the actual working with the clay.

F E E T

Some shapes are improved by the addition of feet. Here again it is essential to observe the nature of clay. Examine really fine shapes, and notice how, on the finest pottery shapes, the feet seem to grow out of the pot and so make one complete whole: they never have the appearance of being just added as an after-thought.

After deciding the shape of the foot, make blunt impressions with a modelling tool on the pot where the foot is to be affixed and also on the foot itself, dab some slip on the spot and press the foot firmly in, finishing it off with the modelling tool. (This is a rule to be remembered in all cases where clay is joined to clay.)

H A N D L E S

Handles may serve both use and ornament. In studying old pottery much variety will be found in them. They may be round, flat, twisted, or just modelled closely to the pot, or continue a line of shape and so improve the design.

The strongest and best way of making a handle is that of the old peasant potter. Take a lump of clay, roll it into conical shape. Moisten with damp sponge and proceed to stroke and pull it out to the required length. This requires a certain amount of skill and practice. A simple way is to roll the clay as in coiled pottery. Cut off the required length. Scratch the pot where it will eventually adhere, dab on slip in these points pressing the handle well in, taking care to exert equal pressure with the left hand

inside the pot, in order that the shape be not dented and so destroyed.

NATIVE POTTERY OF TODAY

NORTHERN NIGERIA

In the British Museum, London, there is the actual equipment used by a native potter in Sokoto, N. Nigeria, photographs of which are here reproduced.

This is how they are described:

"The entire body of the pot is made by pounding a 'pan-cake' of clay **A**, Plate 3, page 14, on the clay-mould **B**, Plate 4, page 15, which shows two stages, with the pestles of various sizes **C**, Plate 3, the smaller sizes being used as the opening of the pot is reduced. **I** is the piece of broken pot on which it is revolved during the making. The mouth-piece is added separately, being modelled from the clay ball **D** with the right hand whilst the left hand spins the pot on the crock.

A piece of tanned goatskin **E** is used to give finish to the mouthpiece, and a piece of twisted string is rolled on the upper body of the pot to produce the impressed pattern. After being washed with red earth, the pot is polished with a string of baobab seeds **F**. A piece of millet stalk **G** is used for effecting repairs on the inside.

The complete pot, Plate 5, page 16, which shows the last two stages, is burned in an open kiln for about fifty minutes and is then ready for use."

SOUTHERN NIGERIA

In Southern Nigeria there are several slightly differing ways of commencing to make a pot.

They all use part of a broken pot as a mould for the base. After preparing the clay by letting it soak in water overnight, the natives knead it into thick rolls and put it in a dish as seen in Plate 6A, page 25, and then the making begins.

Some of them make a flat "pancake" of clay and, putting it on the broken pot as a mould, thin it out with the hands until it rises about 6 in. as seen in Plate 6A.

When they have raised it about 6 in., a roll of clay is put on from right to left, Plate 6B, and worked up further, being constantly moistened with a wet leaf.

Another roll of clay is put on outside as in Plate 6C, whilst the neck is raised by putting a roll of clay inside and applying water outside, as shown in Plate 6D.

Then a wet cloth is taken, inside which is a small stone. The wet cloth helps to smooth whilst forming the neck and the stone makes circles in the damp clay, Plate 7A, page 26.

In Plate 7B, the lip of the pot is in process of construction, and in Plate 7C the finished pot is ready for the firing, which is described in Chapter VII. During the process of construction a long leaf, a piece of tanned goatskin, or a rag are used for damping the pot. Bamboo stick and millet stick are used for smoothing and working the pot up into the required shape while twisted cord serves to make patterns on the damp clay surface.

UGANDA, EAST AFRICA

Native men in Uganda are seen in Plate 12, page 55. They make their pottery in a similar way, starting building up from the base in a series of rings. On the left is a pot turned upside down to dry the base.

KENYA COLONY

Plate 13, page 56, shows women potters in Kenya Colony. A skin containing the potters' requisites is seen whilst mother and daughter-in-law sit on the ground making their pots as previously described. The base moulds made from potsherds can easily be seen, also a finished pot to the right. Chickens drink from the broken pot containing water, whilst friends and relatives seem to surround them and give to the whole scene an air of domesticity.



A



B



C



D

PLATE 6. Handmade pottery in Southern Nigeria

By permission of the Royal Anthropological Society

- A. *Woman potter of Utkon*—working up the base of a pot
- B. *Woman potter from Sabongida*—putting on roll of clay from right to left
- C. Roll of clay put on outside to form neck of pot
- D. The neck was raised by a roll of clay on the inside and water applied on the outside



A



B



C



D

PLATE 7. Handmade pottery in Southern Nigeria

- A. A wet cloth with a small stone in it used for smoothing and also making ornamental circles
- B. Lip of the pot formed with wet cloth and fingers flattened outward
- C. The pot ready for firing
- D. Taking the pot out of the fire (see Chapter 11)

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CHAPTER IV

SLABWORK, BRICKS, TILES, ETC.

"The brick is classed amongst the earlier inventions of the arts, and has descended, with various modifications, from the building of the Tower of Babel to the present day."

DR. BIRCH

Anything that is built up from a slab of clay has become familiarly known in the schools as slabwork, a term which covers a wide field.

The making of simple bricks and tiles that can be used to build with, generally appeals to children, when baked.

A slab is almost the first form a child makes of a lump of clay, because its first impulse when given the clay is to bang upon it with its hands until it is flat. Here, then, is a good ground upon which to work with many children.

Bricks, or tiles, can either be modelled by hand, or pressed into a small wooden frame, or plaster mould.

The clay used may often be improved by adding "grog" or finely ground and already fired clay. This prevents the bricks or tiles from cracking and shrinking too much in drying.

A brick mould can easily be made in the woodwork class from hard wood measuring internally the required size of the finished brick plus allowance for shrinkage both when drying and after being fired, Fig. III (4). If exactly accurate measurements are required in the finished brick, experiments must be made to discover the amount of shrinkage, as this varies with the kind of clay used.

The mould is merely a rectangular box without top or bottom, with rails outside to serve as handles. The brickmaker slightly

moistens the mould and sprinkles sand over it and also over the bench. Then he takes a lump of well wedged clay, lifts it above his head, and throws it with violence into the mould, so that the force with which he does it expels all airholes and causes the clay to entirely fill the mould. As this is not an advisable method in schools, unless quantities are being made for a building, the nearest approach to it must be used—by pressing the clay firmly into the brick mould, cleaning off the top surface with a ruler or straight-edge and sprinkling with sand.

An expert brickmaker can give the mould a quick turn and so release the clay brick at once on to a board on which it is taken away to dry. This may be done by children, but the clay sometimes requires loosening by running a large-blade palette knife around it and so detaching the brick.

One thing to remember when making either bricks or tiles, is the use to which they are to be put when made. If they are to be cemented either together or on some other surface, it is necessary to roughen their under sides, in order to help them adhere firmly to a plaster or cement.

Some bricks have what is called a “frog” or deep hollow on one side for this purpose, *i.e.* to make a key for mortar to bind it and so make more secure. This may be achieved by nailing a piece of wood on to a board rather larger than the brick mould and placing it under the mould on the bench, Fig. III (1 and 2). When clay is pressed into the mould over this, the impression will have the required hollow.

There are several ways of making a tile frame, but the simplest one is shown in Fig. III (3). Another way is to get two pieces of hardwood (which is unaffected by moisture), of the size of the tile when damp. (When determining this size it must be borne in mind that the clay shrinks both in the drying and in the firing process.)

One of these pieces of wood is to form the bottom of the tile-box. Around this, nail sides of wood, measuring in height the thickness of the damp tile, plus the thickness of a second piece of

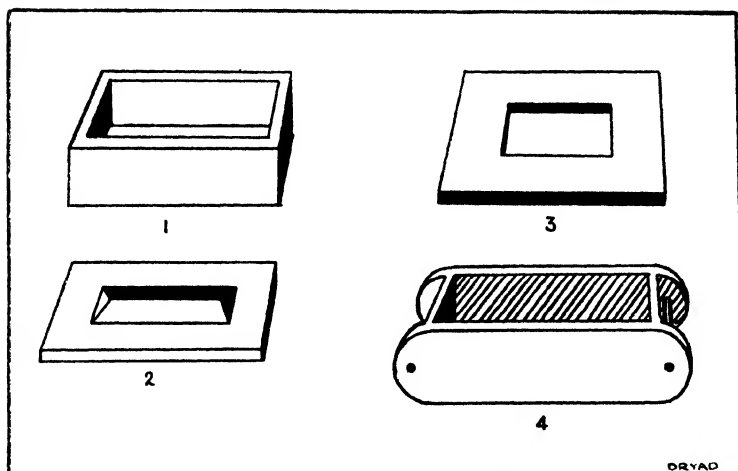


FIG. III. Brick moulds

wood, which will be placed inside the box, and form a sliding base, on which the tile can safely be removed from the box.

Dust the tile box with dry clay dust or sand. Then take a well-wedged lump of clay and press into the box, care being taken to expel all airholes which would cause the tile to explode in the firing.

Make the top true with a ruler or straight-edge and if not too smooth a surface is required, it makes an interesting effect to dust sand over the face of the tile also. If, however, a very fine surface is required for painting, it is necessary to smooth this carefully with a broad palette knife, or where the body of the tile is coarse, to dip it into fine slip when leather dry.

A knife may be run round the tile close to the frame, the box given a sharp tap and the false floor pushed up with the finger, until the tile is released and removed from the frame.

If more loose pieces of wood are made to serve as sliding bases, the tile may be left to dry for a while just as it comes out, or may be reversed by a piece of glass (or straight biscuit tile) being placed above it, turning it over and so taking it off on to the glass

and stacked up to dry with glass between. When somewhat dry the glass may be removed and any touching up done, and pieces of clay put in between each tile at the corners, thus allowing the air to circulate around each tile until they are absolutely dry. Care should be taken to keep them out of a draught, as that tends to warp the tiles. When ready for firing they will need at first a slower heat than pots require because there is greater thickness for the heat to penetrate.

Tiles with raised outlines such as one sees in fine old Moorish work may be made in either of two ways:

(1) The raised outline may be put on in a similar way to that of icing cake. For this a slip-tracer must be obtained and filled with slip. Squeeze the slip through following the line of the required pattern with the raised line of slip. This has also been done with a quill full of slip, letting the slip trickle on the line.

(2) The tile with its raised outline may be made in the same tile mould as previously described, after having first prepared a plaster tile to replace the loose wooden floor of the mould.

To do this take the tile mould with the loose floor already in. Oil the sides and floor and make a plaster tile in the space where usually the clay tile is squeezed. When it is set remove and clean up the mould.

The design is then traced on the plaster tile, and the outline incised with a hard-pointed pencil or similar tool. As the incision needs to be square to insure strong clay outlines eventually—it is good to finish the incised lines with a chisel-shaped point—a clay squeeze should be taken from time to time to judge the work.

When the plaster tile is thoroughly dry remove the loose floor of the tile mould, and insert the plaster tile in its place, taking care the pattern is uppermost. Proceed as before to make the clay tile which, when it is removed from the plaster tile, will be found to have a raised outline.

After drying and firing, coloured glazes can be applied to the different compartments with a brush, and these must be put on thicker than usual to give a rich effect.

INLAID TILE

If only one tile is needed, make a clay tile in the usual way and, when leather dry, trace on the design and cut it out to the depth of about one-eighth of an inch. This is done as follows:

On a plaster tile so fixed in the tile mould as to allow only a one-eighth inch clay tile to be made on top of it, draw the design over the clay.

Then cut away the design until you have a hollow where the design should be. Take a plaster cast of this, taking care to make the plaster only the thickness of the loose bottom to the tile box.

When dry it is then placed in the box where the false bottom should be, and a clay impression taken of the plaster mould. This clay tile will have the pattern sunk. When it is ready for handling, another coloured clay may be pressed gently into the sunk pattern, the top being trued with a straight-edge when sufficiently dry, then set aside for further drying.

POTTERY MOSAICS

Mosaics are small pieces of a hard substance arranged to form a design. The word is supposed to have its origin in the Greek word *Mosaikos*, meaning "belonging to the Muses" (the Muses being Greek goddesses who presided over the Arts). Much beautiful work has been done in this form of art with tesserae of glass, marble, wood, pottery, etc.

In a small book so large a subject can barely be touched upon, but Mosaic in its simplest form is interesting work for the pottery class.

Make tiles of ordinary creamy white clay and others of red clay. Cut these up into even cubes or tesserae, Fig. IV (or where odd pieces of slab are left over from making slab pots, the children could cut them up for tesserae for mosaic pattern). Trim up and leave to dry. Fire them either inside other pots or on slabs of fireclay. A good way is to have fireclay tile boxes filled with them and to place one above the other in the kiln. If other pottery is being fired at the same time they can be placed inside the pots in the

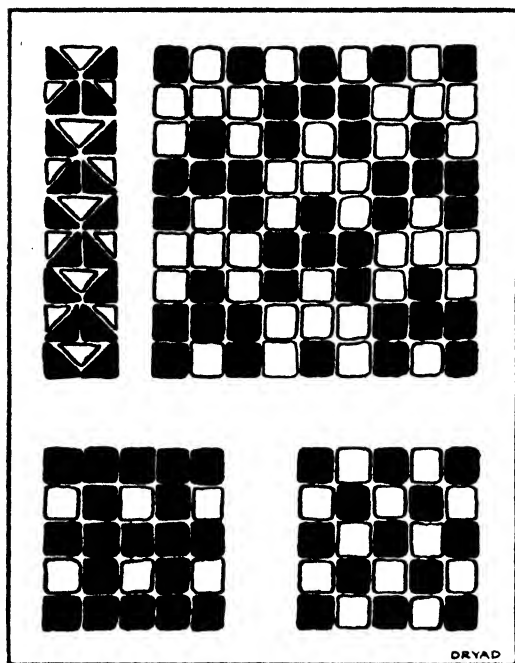


FIG. IV. Mosaic

biscuit kiln. If glazed and fired a second time, it is necessary to fire them in the tile boxes.

Interesting patterns can be made with red and cream clay tesserae, beginning with variations of the simple check. In more advanced classes more elaborate designs can be carried out—cutting the clay pieces to the shapes in the design. In this case the design would be divided

up in a similar way to stained glass, the cement setting representing the leading in windows, being used for the same purpose of binding together and strengthening. Architectural panels and fireplace surrounds look well treated in this way.

When the pattern is made the pieces of tesserae can be set either in plaster or cement, and so held together permanently, in the following way:

Take two pieces of glass. On one place a piece of linen, on which arrange the tesserae face side uppermost. Fix all immoveably in position by a wall of clay surrounding the whole pattern. Then pour on plaster, allowing it to flow in the crevices, taking care to clean it off the surface of the tesserae before it is set.

Plaster soon dries, and when set enough to handle, place the second piece of glass on the face of the tesserae, turn the design over on to this and remove the other glass and cloth. A second mixing of plaster is needed to fill in the back; this should be about $\frac{1}{2}$ in. thickness above the tesserae. Boards can be framed round the design before the plaster is poured in allowing for this $\frac{1}{2}$ in., and these should be carefully cemented at their angles with clay. To make quite sure they are firm, a

brick could be placed against each board. Canvas can be placed on the back of the tesserae after the interstices at the back are filled and before the $\frac{1}{2}$ in. thickness is reached. This strengthens the work.

Where the mosaic work is needed for hearths and the like, it is better to use Portland cement instead of plaster as the binding material.

BUILT-UP SHAPES

Leading up from the making of tiles, we next come to the square, rectangular or flat-sided pot.

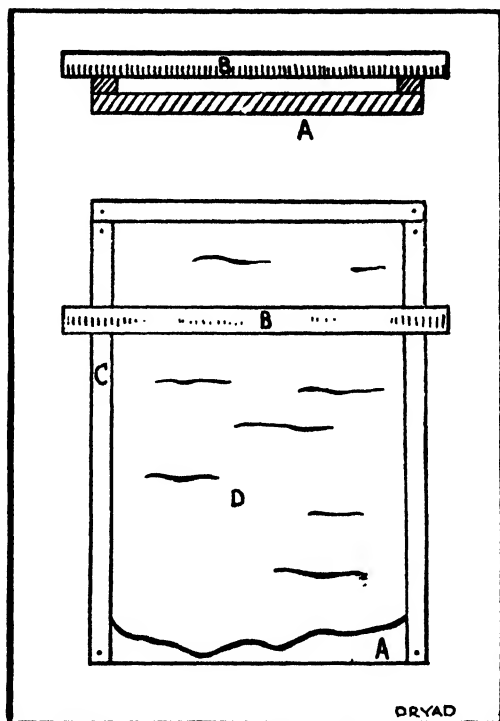


FIG. V. Board for built-up shapes

- | | |
|-----------------|-------------------|
| A. Board. | C. Strips of wood |
| B. Rolling pin. | D. Clay |

It will be found useful for this purpose to make several boards with even strips of wood $\frac{1}{4}$ in. to $\frac{1}{2}$ in. thick nailed on three of the sides, Fig. V.

As pressed clay is apt to stick to boards even after dusting with powdered flint (tied up in muslin in order to spread evenly on the board) several devices are used to make the clay leave them easily.

One way is to put wash leather, butter muslin, or even brown paper on to the board between the strips of wood, whilst yet another has grooves on the strips of wood to allow a sheet of glass to be slid in when in use.

Press the clay (which should be well wedged) well on to the board until it is covered in between the strips. Roll it with a rolling-pin just like pastry (*N.B.*: rolling-pins can be made from pieces of broom handle), then clean off all surplus clay with a taut wire or straight-edge.

When the upper surface is smooth, draw out the sizes of the pieces of clay required for your pot and mark with a penknife but only cut half through the clay. With a sharp jerk of the clay at the open end of the board, lift the whole piece off from the board before detaching the pieces by cutting completely through. This is the best way to secure the edges of the parts.

Take the piece required for the base of the vessel, and place on a small board where it may remain whilst drying, taking care to put a stout piece of paper on before doing so, to prevent sticking.

Make blunt marks with a modelling tool where the sides will be joined on to the base, also on every side where it will touch another part. Damp with water or slip and press well together. Make some very fine rolls of clay and, after damping, use them to cement up each joint from the inside of the pot. So model in the roll that it is scarcely visible when finished. This gives a secure and slightly rounded appearance to the inner corners.

When all is completed take a knife and remove all sharp angles outside the pot. Clay is a soft plastic medium, and its very nature should give character to moulded clay shapes. Sharp angles are

suitable to wood and metal, but in clay they prevent the glaze from adhering in the firing and also give the pot a hard unnatural appearance, whereas rounded corners preserve the rounded look of clay objects.

CHAPTER V

THROWING

"Hath not the potter power over the clay?"

ROMANS IX, 21

"In quietness and in confidence shall be your strength."

ISAIAH XXX, 15

THROWING

Although the making of pots in moulds is a quicker and more effective way for the beginner, yet the more educational way is the making of pots on the wheel. This method of making pottery is called "throwing" or "spinning," the former word being most used.

There are several kinds of potters' wheels, but quite a simple and good make is the ordinary kick-wheel which is worked with the left foot (see Fig. VI).

Clay for throwing should be very well wedged and made into round balls which the hand can hold conveniently. With the wheel-head clean, throw the ball of clay with some force on to the centre of the disc. Then set the wheel in motion being careful to revolve it anti-clockwise. A bowl of water, fine sponge, wire cutting-tool and a tool for finishing should be at hand. Dip both hands in water and do this constantly during the throwing process, so that the clay may glide through the hands without sticking, that nothing may retard the perfect revolutions of the wheel. The centre of the revolving lump of clay should be still and it is the thrower's first and last business to true the lump of clay with this central stillness.

CENTRING

Leaning the left forearm on the wheel's trough, almost at right angles to the body, endeavour to keep the arm absolutely

stationary, whilst grasping the clay with both hands, Plate 8, page 43. Guided by the rigid left hand the plastic clay follows the line of least resistance and must come true to the centre.

This centring of the ball of clay is very important, and a beginner does well to practise it repeatedly until it is mastered, otherwise difficulty will be found in the later stages.

RAISING

When once the ball is centred, the next stage is to raise it into a shape resembling a lighthouse, then lower it again. This raising brings the clay into a better working condition and makes it more ready for the next stage. To raise the clay use a firm but gentle pressure. The clay, being plastic, must go somewhere under pressure: it cannot go lower because of the wheel-head, therefore it must go higher: between the hands, Plate 8.

Let the hands rise as it rises but do not pull the clay upwards or it will be pulled off the wheel. True the top of the shape horizontally with the thumbs.

LOWERING

Then proceed to lower it with the thumbs or palms of the hand, taking care to receive it back into both hands and re-centre it when it comes into the shape of a ball again. When doing this movement it is necessary to keep the fingers even and exert

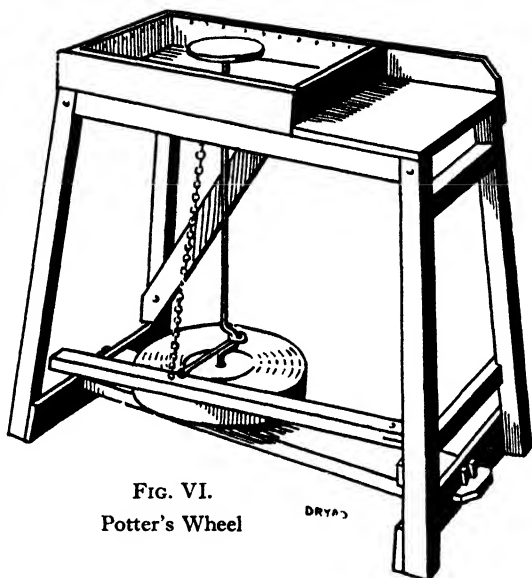


FIG. VI.
Potter's Wheel

DRYAS

regular pressure, otherwise one finger may cause too deep an impression and the clay break off in consequence.

It is interesting to note in regard to these preliminary exercises in throwing how each one is based on an earlier lesson.

Directly the ball of clay is thrown on to the wheel-head, it assumes a shape slightly broader at the base, and the lighthouse shape of the second movement must always be broader at the base (*cf.* the Eddystone or any other lighthouse). This broad base prevents the clay from suddenly breaking off.

OPENING OF THE BALL

After re-centring comes the opening of the ball. Both hands are placed around the ball of clay, the thumb of the right hand descending with slight pressure into the centre of the lump as far as is required for the inside of the pot. The hole thus made should have a gradual slant.

Workers can judge the thickness that is left for the base of the pot by stopping the wheel, taking a pricker (made from a steel crochet needle with the hook removed and the point sharpened), stabbing through the base, thus measuring off the thickness. Set the wheel revolving again, when the slight hole caused by the pricking can quickly be filled in by pressing one finger lightly over it.

It will be noticed that the greatest thickness now lies near the base of the sides. The next step is to place the hands as in opening the ball, and with the right thumb down in the hole draw it towards the fingers of that hand and so press the clay where the greatest thickness lies (Plate 9, page 44). This pressure will again cause the clay to rise, and having risen into a stumpy shape with sides very thick, but of almost even thickness, it now remains to true the top horizontally. The left hand has all the time been like a mould keeping the clay to a certain shape when opening it. Drop this over the edge and true it with the part of the hand between the thumb and palm.

KNUCKLING UP

The next stage is called knuckling up (Plate 10, page 45). Put

the three first fingers of the left hand inside the pot and work mainly with the soft part of the third finger. Place the right hand knuckle outside the pot, and remember always that work is being done at one fixed point, and the wheel is bringing all the pot past that point. So always have the three fingers of the left hand inside the pot directly opposite the knuckle of the right, which is outside.

Now put the tip of the third finger of the left hand, which is inside, well into the bottom and press against the outside knuckle with a gentle pressure in order to work up all surplus clay from the base. As before the pressure will cause the sides to rise. Let your hands rise with the clay but not faster than the wheel is working. This is often the cause of failure in the beginner. He does not wait long enough at each pressure of the hands for the wheel to complete a revolution and so rises in an open spiral, making parts of the sides of the vessel thicker than others. As a consequence the vessel may soon collapse; if it does not its top will be irregular and the whole pot lop-sided, so it will be impossible to proceed to shape it as it should be.

Having knuckled it straight up to the top in the form of a cylinder the top edge now needs a gentle touch to put it in order. With the forefinger of the right hand lightly placed on top, at the same time as the thumb and forefinger of the left are lightly holding the edge, a light touch is given making the top firm and true (Plate 10, page 45).

SHAPING

This form is now ready to be shaped in whatever way the thrower wishes. The shaping is mostly done with the hands in the same position as they were in knuckling up (Plate 10). When it is required to bulge the shape outward more pressure is exerted by the fingers inside the pot, and when it is required to take the outline in, by pressure with the knuckle outside.

The pot may also be drawn inwards by holding the side of it lightly between the thumb and two fingers of the right hand, keeping the left hand round the pot as a support and drawing the right hand in towards the centre.

A fine sponge (or one fastened on to a stick for a tall thin pot) is useful for taking up surplus water which has settled in the pot. This is done whilst the wheel is revolving.

All through the process of throwing it is well to note certain points. First, as regards the preparation of the clay, see that it is in perfect condition. True to the centre in order to get symmetrical work. Ensure a firm foundation throughout each stage. Exert a firm but gentle pressure, greater in the first few stages and lighter and lighter as the pot develops. It is also well to note that the quicker the wheel revolves during the first few movements of the hands the better, but when the knuckling-up stage is reached it should revolve a little less quickly.

The handling of clay on the wheel should be in the nature of a caress, but there should be no fear in the handling, and the more love and joy brought to bear upon it, the finer the pot when made.

A wire cutter is needed for cutting the pot off the wheel when it is finished, while a board should be ready to receive it. Hold the wire cutter firmly with both hands, keep it pressed well down with the thumbs and draw it under the pot. Then with both hands support the pot lightly and remove to the board. It is now ready for drying. When dry enough to handle lightly without spoiling the shape the pot may be touched up and feet or handles put on. Then it is left to dry thoroughly before firing.

When making a bowl, a round board should be fixed on the wheel-head to facilitate the removal of the bowl when made. This can either be done by having the wheel-head specially made in which the board may be sunk, or a flat even platform of clay can be thrown first and the board fixed to this by placing it upon this and banging the hand in the centre of the board to hold it in place until the bowl is made. Cut under the bowl with the wire cutter to release it from the board for drying purposes, but lift the board with the bowl off the wheel instead of the bowl alone which would become distorted in the process. Some throwers prefer to make everything on boards.

CHAPTER VI
DRYING AND FINISHING

"Trifles make perfection, and perfection is no trifle."

MICHAEL ANGELO

When a pot is made it needs to dry somewhat before touching up. As soon as it is dry enough to handle without damaging the shape the sharp line at the edge of the base needs rounding with a fine damp sponge. Other marks, such as the thumb marks on a thrown pot, may now be removed. It is always best to sponge a pot round in the direction in which the marks were made when it was on the wheel, and never up and down, which is contrary to the formation of the pot. At this stage handles and feet may be put on. Afterwards the pots should be set aside to dry thoroughly.

When drying it is necessary that the heat be even all round and that the pots are not left in a draught which might cause them to alter shape through irregular drying. Pots which are quite damp must not be placed near heat too soon, but be allowed to begin drying slowly under natural conditions, for a sudden application of heat might cause them to crack, or added pieces, such as handles, to spring off. Directly pots become hard they can be put nearer the heat.

Some schools have drying cupboards built over the pipes which heat the room, or shelves above the stoves. A cupboard is best because it keeps meddling fingers from handling the pottery before it is fired—it is most brittle and requires the greatest care in this state. However the pottery is dried it is good either to have perforated shelves or to raise the pots upon saddles (used in firing) or similar devices in order to allow the warm air to circulate around them freely. Because large pots may dry unequally they should be carefully looked over as they dry, and when it is seen that the tops

are drying more quickly than the bases they should be inverted in order to make the rate of drying as even as possible.

If the pots have become too dry before they are touched up, sandpaper can be used, or a knife, in order to remove sharp edges, taking care to sponge away scratches or any hard metal-like appearance in the shape by always finishing off with a damp sponge.

Pottery, before it is fired, when it is technically said to be in a "green" state, needs very careful handling. Both hands should be used when handling it except for the smallest articles. Never hold "green" pots by gripping a small part or the weight of the pot may cause that piece to break off. "Green" pots should not be held by the handle, or lids by their knobs, or the common expression of the charwoman when washing up—"It come off in me 'and!"—will be more than justifiable, for dry clay has no strength with which to support its own weight.

Having sounded a few notes of warning, it is well to say that with thoughtful care everything should go through this stage successfully. It is most important to notice before placing a pot in the kiln whether it is absolutely dry and without any traces of moisture; otherwise there is danger of it exploding during the firing. If, however, it has reached the stage of being "white hard" it is ready for the first firing.

Should time be needed and it becomes necessary to retard the drying of a pot (in order to fix handles, knobs, or feet) on another day, this may be done by keeping the pot wrapped in a damp cloth and in an air-tight tin—or in a larger damp box shared by the class.

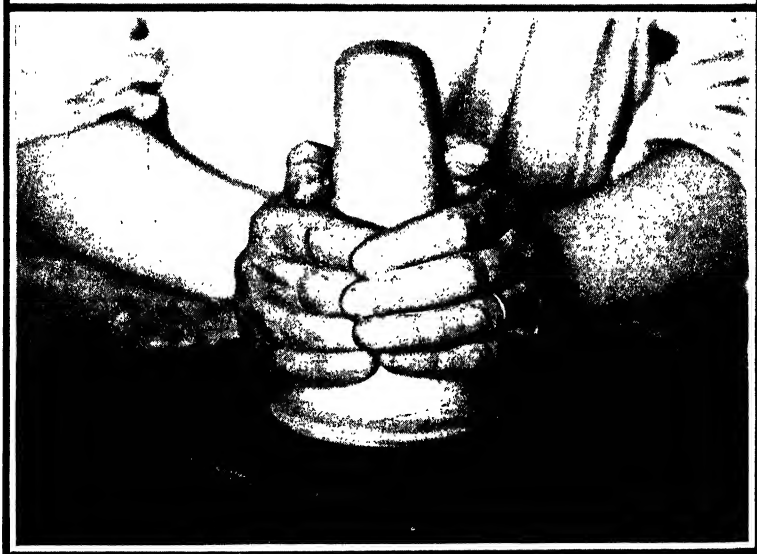


PLATE 8. Throwing: Centring the ball of clay (*above*)
and raising the clay (*below*)

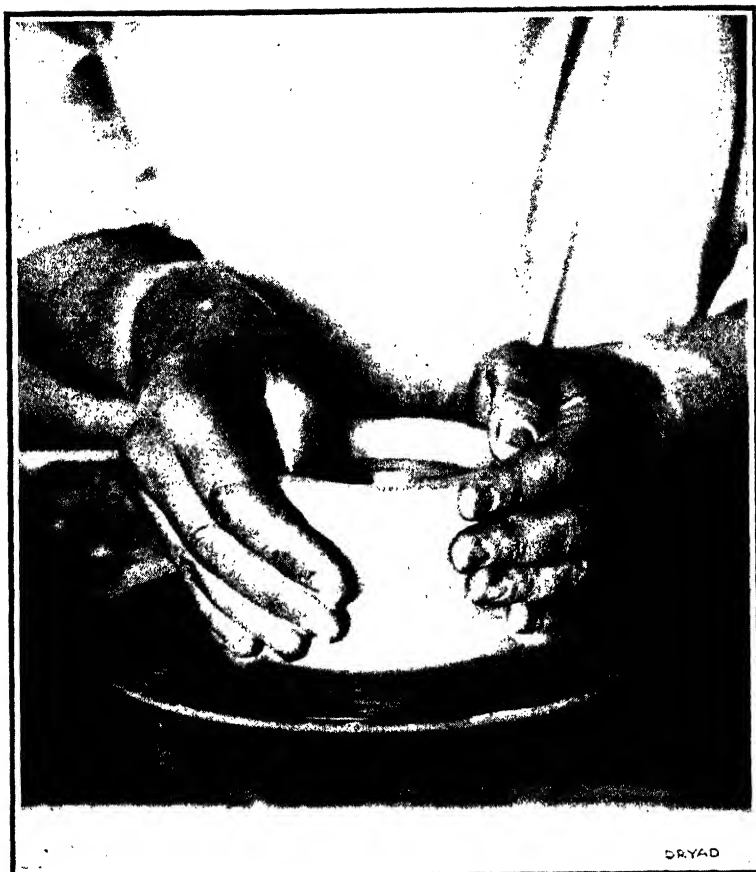


PLATE 9. Opening the ball



PLATE 10. Knuckling up



PLATE 11. Shaping

CHAPTER VII

FIRING—BISCUIT

In Tudor days pottery jars for butter were made in the villages in Staffordshire. "They (the packmen) had to stop at almost every house, for the farmer, as well as the potter, usually baked an ovenful every week."

F. L. BOWMAN

The firing of the dry clay pots is done after they are what is known as "white dry," but not before, for the slightest moisture will cause them to explode when subjected to a great heat.

While in the stage before firing they are called "green," after they have been fired once they are spoken of as "biscuit."

It is as essential for a potter to have a furnace or kiln as it is for a cook to have an oven. There is much to learn in the process of firing, and each school should possess its own kiln. Something might be done if several schools in a town joined in using one kiln. Classes would go to the kiln from time to time and have the principles of firing explained to them.

PRIMITIVE FIRING

Where a school has large grounds primitive firing may be done when it is desired to show children early methods. But with such firing there is great risk because of sudden heat brought into contact with the pots, and no means of regulating the rise of temperature.

Plate 7D, page 26, shows a native woman of Southern Nigeria taking a pot out of the fire after baking it. The baking in this case was done by placing the pots when quite dry on a large piece of bark with fuel of wood and bark placed round them—the process

would look like a bonfire, fuel being continually added until the pot was fired. The clay was so constituted that in the space of an hour or so the pottery was fired enough for use. The fire would be allowed to go out and the whole to cool slowly.

Another way that has been tried at a school is to put a concrete slab on the ground and place the pots on it, with a wall of bricks round them, and iron bars across the top of the bricks. Upon the bars light a fire. When the fire is well going, put on coke, and keep it constantly mended with coke at intervals during one day. With ordinary potter's clay as used in England this would take one whole day to fire: from about 8 a.m. until 9-o or 10 p.m. Such a firing can only be done occasionally.

A fair-sized coke kiln has been used successfully. It is large enough to hold about 100 pots and about 16 hours are required for its firing, with regular stoking every two hours. As it holds so many pots there is only need to fire it at long intervals.

A small brick kiln, fired with coal and coke, which may be either built into the school heating chamber or erected in the open, has been found useful. Particulars of the design and construction of such a kiln will be found on page 97.

Considering everything, the most practical kiln, for school use, is either a gas or oil furnace. (It is necessary to use the best quality of oil otherwise the oil feeder becomes choked.)

FIRING WITH A GAS KILN

The gas furnace is made with a fireclay muffle or inner lining which, while it protects the pots from the gas flames, allows them to encircle the muffle, and pass away into a pipe which takes the fumes away.

There are several patterns of gas furnaces. The one in which the burners are placed directly under the muffle is the one being described and illustrated here (Plate 14, page 57). The taps of the burners are at the side and there is a space between the muffle and the outer casing through which the flames of the burners play, as they encircle the muffle, on their way out by the flues at the top of the furnace. The burners are lighted through a hole in

the outer casing in front of the furnace, and this hole is closed either with a stopper or sliding door. There are dampers in the upper flues which must be opened before lighting the burners, after the gas has been turned on at the meter.

RECORD OF FIRING

It has been found useful to keep a record of every firing in tabulated form giving the date, the kind of kiln firing—in this case “biscuit”—the number of hours taken in firing, the reading of the meter before lighting the kiln and after firing (this in order to arrive at the consumption of the gas), the cost of gas, and the number of pots fired.

MENDING CRACKS

Care must be taken to mend any cracks in the muffle before filling the kiln. This is done with fireclay and water: with fireclay in a bowl mixed to a paste with water, water in a jar, a brush and a large palette knife. Begin by damping the cracks with a wet brush. Then put on the fireclay paste using the palette knife to press it firmly into the cracks and smooth it off level with the surface of the muffle—a damp brush will complete the smoothing.

Should the sulphur from the gas penetrate through the cracks it has a tendency to blacken the pottery in the biscuit, besides causing the glaze to blacken, bubble and “crawl” in heaps, and to alter the colour completely in some glazes. As a rule cracks in the muffle need attention before every firing.

FALSE FLOOR

In biscuit firing it has been found an advantage (when the gas burners are directly under the muffle) to contrive a false floor to prevent sudden heating of the lower layer of pots. This floor may be made by placing a fireclay shelf or shelves (not more than $\frac{3}{4}$ in. thick) on “saddles” to allow the hot air to circulate freely. Unglazed tiles 6 in. square are also used.

FILLING THE KILN

On this false floor place the pots, remembering to raise them

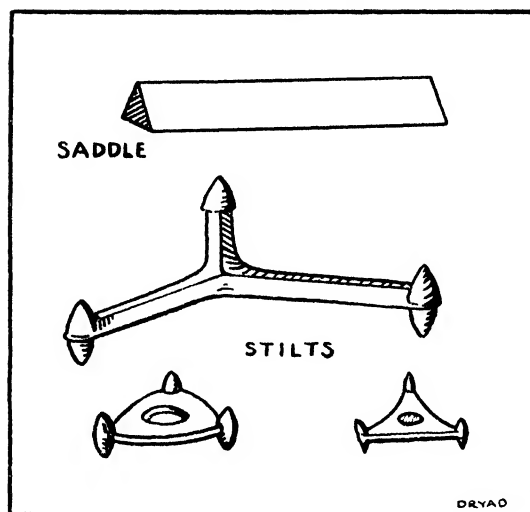


FIG. VII

Saddle and stilts used to raise the pots
when firing

upon "saddles" to allow the heat to circulate freely amongst them, Plate 15, page 58. This applies to the placing of one pot inside another. It is good to put a stilt (see Fig. VII) within the first pot on which the inside one may rest. It is only in a biscuit kiln (where the pots do not stick together) that they may touch one another.

Lest the weight of the pots piled one on top of another should prove too heavy for the under ones it is good to place fireclay shelves at intervals. These are supported by fireclay supports (see Plate 15), which may either be made by the workers or can be purchased from any firm selling potters' requirements.

CONES

Cones which aid in determining the heat when firing, and cone-holders may be obtained from the same firm. These cones are made to register different temperatures and do this by bending directly the required heat is attained. For instance, the cone marked 05 is guaranteed to bend when the heat attained is 1,000° C.

Insert a cone in a holder (dusting first into it a little flint to prevent the cone from sticking to the holder), see Fig. VIII, and place it in the centre of the furnace, taking care when filling the

kiln to keep a clear view of the cone from one of the spyholes in the door.

A biscuit kiln in a school is usually fired up to cone 03 or 05, *i.e.* 1,040°C. or 1,000°C. It is necessary to have the biscuit

well fired in order to make a durable pot which will not chip easily.

The required degrees of temperature needed for the firing of biscuit depend on the clay or paste used in making the pot. There is an Italian paste which, firing at quite a low temperature, hardens the pottery sufficiently.

It is necessary to find the required heat of every clay by testing because some clay is not strong enough to retain its shape at too great a heat.

The firing point of clays can be raised by the addition of flint and lowered by the addition of felspar, the quantities being found by experimental tests.

DOORS AND SPYHOLES

When the kiln has been filled, and the cone put in, the doors are lifted into place. Usually a gas kiln of the studio size has two thick fireclay doors placed one above the other, with holes in each to serve as spyholes. These holes are closed by the insertion of fireclay stoppers.

MOISTURE TO BE GIVEN OFF

When firing a biscuit kiln it is essential to increase the heat very gradually at first in order to allow all moisture to pass off

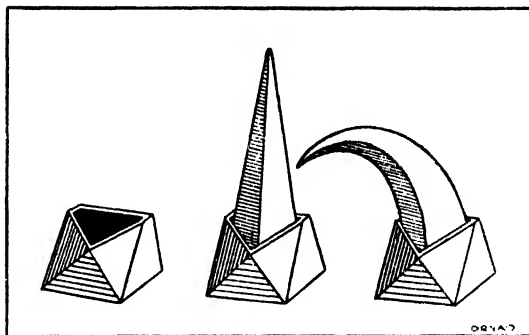


FIG. VIII. Cones

slowly, for even a slightly damp pot is likely to explode if suddenly heated.

It is assumed that all the "green" pots have been dried to the utmost before being placed in the kiln, but even so, as the great heat of firing rises it finds some moisture still lurking in their composition which must be evaporated.

TEST

During this time neither of the spyhole stoppers are put in. A good way to test if all moisture is gone is to put the palm of the hand above the top spyhole, then draw the fingers across the palm. If any moisture is still coming out it will seem like a damp breath which is felt on the palm.

STOPPERS IN

For the first two or three hours great care should be taken and a low heat applied until the muffle begins to show a red glow inside. Then the stoppers may go in. (The lower one may be put in a short while before this stage.)

CEMENTING THE CRACKS AT THE DOORS

As the glow spreads, the doors should be cemented up so that no heat escapes through the crevices between doors and furnace. Asbestos cement is the best thing for this purpose, because it can be used repeatedly if it is collected before opening the doors when unpacking the kiln. Mix the cement with enough water to make a paste, and put it on with a large palette knife.

Directly the red glow has spread over most of the furnace the heat may safely be increased and continued until the firing is finished.

Biscuit can be fired in about five hours in a small studio gas furnace, when the pots are thin and made on the wheel, but it has been found best with school work (which consists of pots made in several ways, many of which are hand-modelled, and all more or less on the thick side), to allow an extra two or three hours of very

slow firing at the commencement, and so prevent casualties and consequent disappointment.

LIGHTING THE GAS

When lighting the burners, turn on the least possible supply of gas at the meter; by this is meant enough gas for the burners not to light back, or go out, and only a few burners are lighted at first. Close air inlets at first, then light all burners from the first one but immediately extinguish those not required lest the sudden heat crack the muffle.

A point to watch is to have the taper lighted *before* the gas is turned on, and also the dampers in the flues partly open, otherwise a slight explosion may occur which might jar the pots inside the muffle.

Turn on gas at meter—or main supply, light taper, put in hole, turn on gas at first tap which will light at once, withdraw taper and blow it out. Light burner No. 2 from No. 1 and so on.

If it is a gas furnace with twelve burners it has been found useful to light say No. 1—7—12 with no air for about three quarters of an hour. This gives a long licking flame which curls around the muffle gently and is most suitable at the outset. It is not advisable to keep the flame like this longer because this type of flame is inclined to soot up the furnace. Gradually introduce a little air when the flame becomes hotter and more concentrated, until as much air as possible may be admitted. The greatest heat is obtained by the right admixture of air and gas.

As more gas is turned on and more taps are brought into use more gas must be turned on at the main, until a roaring sound is finally heard. After the glow has appeared all danger to the pots is over. Another kind of roar occurs when a burner lights back. There is nothing to fear, but the roaring tap must be promptly turned off, and the burner re-lit. The cause may be: (i) insufficient gas from the main, (ii) foul burners, (iii) the nipple of the burner choked with dust, (iv) too much air when burner is cold.

When the cone has bent, turn off gas at the main, turn off each

burner, close down dampers in the flues and leave to cool until the next day before opening and unpacking.

When unpacking have everything in order in the kiln room and proceed in an orderly way. The stoppers may be taken out first, then all asbestos cement collected into a bowl for re-use, the doors lifted down, the pottery put out on boards ready to be carried away, the "saddles" and stilts each put back into their separate compartments.



By permission of Mr. Brauerholz

PLATE 12. *Men: Baganda, from near Entebbe (the village was called Kasanja) in Uganda,
a tribe on the shore of Lake Victoria Nyanza*

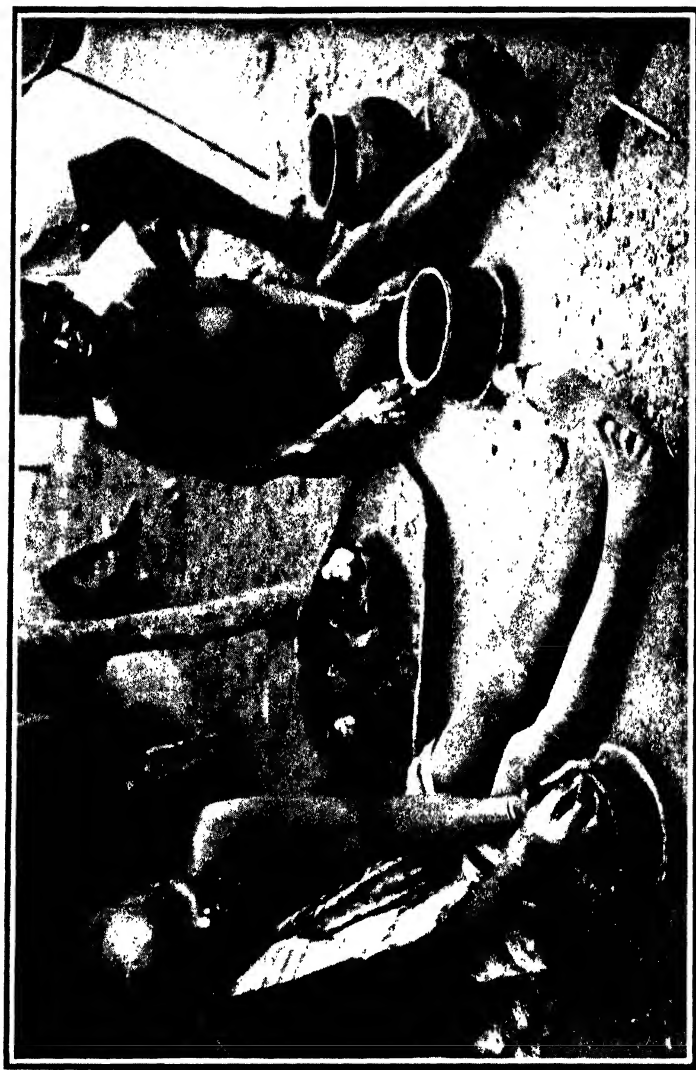


PLATE 13. *Women: Jalu tribe (Nilotic Kairont) from near Kisumu, Nyanza Province, Kenya Colony*
By permission of Mr. Braundholtz

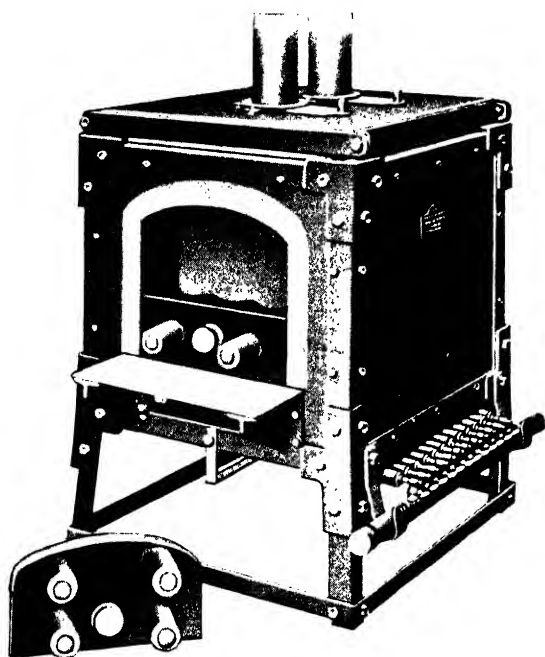


PLATE 14. A small kiln suitable for firing by gas

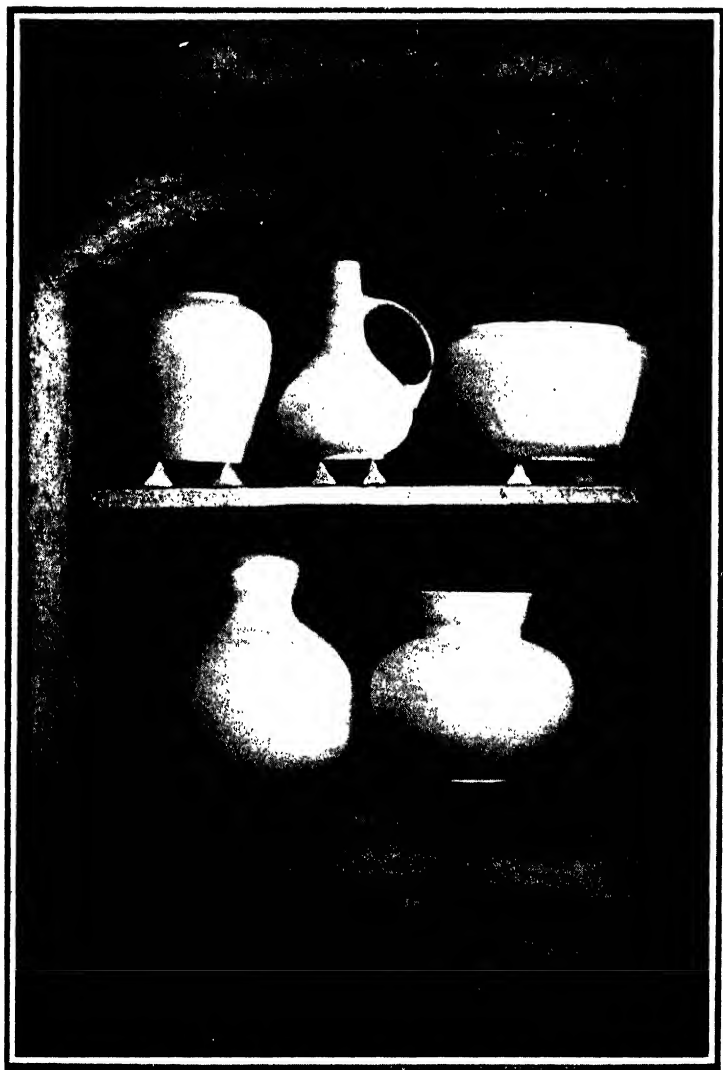


PLATE 15. Interior of a kiln

CHAPTER VIII

GLAZES AND GLAZING

"For the purification of character we need beauty in all things of life."

VOYSEY

The words "glass" and "glaze" have practically the same meaning and origin. In parallel manner glass is supposed to have originated through the fusion of sand and seaweed in a fire on the seashore, and one of the earliest glazes known is composed of sand and soda.

Sand equals silica, and soda is an alkali which can be obtained from the ashes of kelp or seaweed. Thus the chemical names of glaze ingredients are easily remembered by connecting them with natural things known to all.

Until more time is given to the study of pottery it seems best to buy ready-made glazes, just as one buys ready-made paints.

Although colours be bought, the catalogues of firms who deal in potters' requisites offer so much choice that guidance is necessary.

TRANSPARENT GLAZE

A good way is to buy in largest quantity a leadless transparent glaze and to colour this from oxides or glaze stains. The simple colorants of glazes are oxides.

OXIDES

Oxide of Cobalt gives blue.

Black Oxide of Copper gives bluey green.

Red Oxide of Copper gives green.

Red Oxide of Iron gives terra-cotta.

Yellow Oxide of Iron gives yellow ochre.

Oxide of Manganese gives purply brown.

To obtain a bright yellow and bright orange it is necessary to buy glazes which contain some lead. Antimoniate of lead is chiefly used for colouring them. Blues, greens and purples are purer and more brilliant in colour in a leadless glaze.

TIN GIVES OPACITY

The addition of oxide of tin makes glaze opaque and has an effect on glaze similar to that of Chinese white on water-colours. If any pattern has been painted on the pot in the biscuit stage it needs glazing in transparent glaze only.

MIXING WITH WATER

Mix water with some transparent glaze and stir the mixture, adding gradually until the mixture is fine enough to go through a 100 or 200 sieve. Brush this through and then put a little into a cup or small jug, which can be held easily in the hand.

There are four ways of putting on the glaze:

- (1) Spraying.
- (2) Dipping.
- (3) Pouring.
- (4) With the brush.

SPRAYING

Spraying is the most certain way and with young pupils mistakes are least likely.

In beginners' work it has been found best always to spray the glaze over patterns which have been painted on the biscuit, or once-fired pot, see Fig. IX. For this a foot-blower is needed, to which is attached a rubber tube sufficiently long to hold in the hands to work. At the end of this tube a small sprayer is attached. The other end of the sprayer rests in the glaze. The right foot works the foot-blower which sucks up the glaze and blows a spray of it on the pot.

The article to be glazed should be elevated on two saddles, on a revolving disc which a slight touch of the hand can turn. This

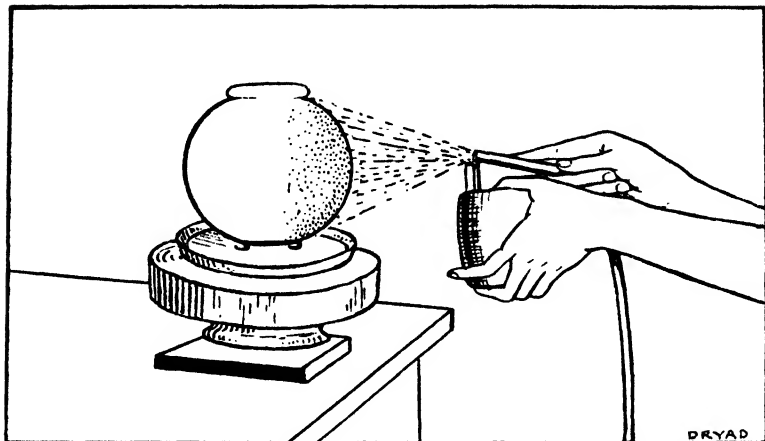


FIG. IX. Spraying the Glaze

should be slowly turned round so that the pot may be evenly sprayed and no place too much. This needs watching carefully lest in becoming too damp the glaze should begin to run down carrying part of the paint with it.

The thickness of the glaze for spraying should be about 35° on a glaze gauge, or thin enough to go through the sprayer easily.

DIPPING

For the process of dipping in plain coloured glaze, the glaze can be thicker than for spraying, *i.e.* from 40° to 60° on the gauge (for transparent glaze from 35° to 40°). Dipping is possible and most economical for class work in the early stages. One large vessel of glaze can be mixed for general use. Afterwards when pupils desire more opportunity for individual choice, more variety of glaze is essential, smaller quantities must be mixed and other methods resorted to.

Sufficient glaze is mixed in a basin or jar, to allow the pot to be completely immersed. Before dipping the pots in the glaze, have some saddles ready, on which to drain them when they are taken

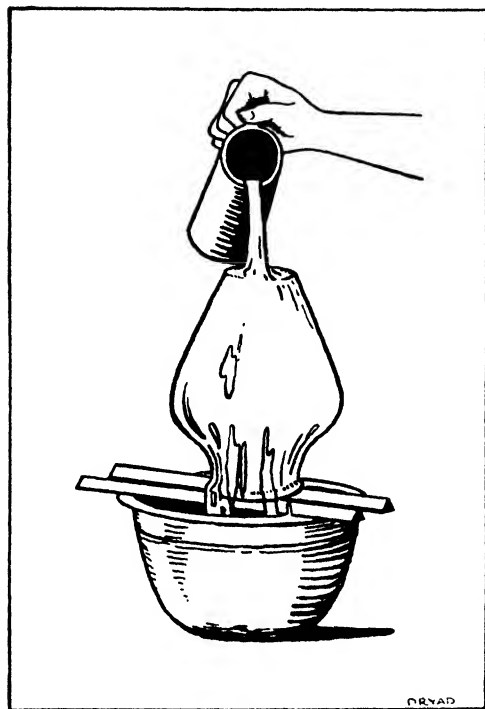


FIG. X. Pouring the Glaze

out of the glaze. This will avoid pools of glaze collecting on the table which would prevent the pot from drying.

Stir the glaze well, then, holding the pot as lightly as possible, completely dip in the glaze. Do not keep the pot in the glaze longer than it takes to dip it. Bring it out at once, drain any glaze from within, and place in on to the saddles. Where it has been held bare patches will be seen. Touch these up with glaze, applying with a brush. Sometimes it is well to paint additional

glaze round the rim with a brush, for if the glaze run down at all it is most likely to go thin on the rim. An old toothbrush is useful to brush off any surplus glaze from underneath the pot back into the glaze jar. The pot is now ready for firing.

P O U R I N G

To glaze the inside of a pot the glaze used should be slightly thinner than for dipping. Have it all ready and well stirred, in a jug. Pour in until the pot is full. Then immediately pour it back into the jug again when it will be found that sufficient glaze has adhered to the pot.

In Fig. X the glaze is being poured over the outside of the pot.

For this method a large jug of glaze, a basin and two pieces of stick are required. Place the sticks across the basin, and on them rest the pot which is turned upside down. Then pour the glaze over the bottom of the pot in the centre, letting it flow evenly down the sides, the surplus glaze being caught by the basin or tub. When dry lift the pot from the sticks, and clear the base of glaze. After doing any touching up that may be required, with a brush full of glaze, the pot is ready for firing.

If a pattern is to be painted on the outside of the pot, it is well to glaze the inside of the pot before painting the outside, as without practice it is not easy to pour back the glaze and avoid any of it trickling over the side.

Trickles can easily be removed with a hard brush if the glaze is transparent. If the trickle is of a coloured glaze, a little stain is probably left which needs a damp sponge to wipe it out.

KEEP POTS DRY

The pot must be dry when the glaze is put on or the glaze will not stick. It is therefore important not to damp the pots immediately before glazing.

WITH THE BRUSH

Glaze can also be put on with a brush but the results are not very satisfactory if wholly relied on because it is difficult to judge an even thickness of glaze, or to prevent parts looking thin and bald.

If, through being very hard-fired, no glaze will adhere to the pots, they should be gradually heated until one can only just bear to handle them, and then glazed.

Interesting effects in colour can be made by imposing one coloured glaze upon another. This may either be done by spraying over the first glaze, putting a second on with a brush, or dabbing on with a small sponge.

A few brightly coloured glazes should be used so that when pottery is taken from school it may add brightness to life as flowers do. Vases made to hold flowers should be more subdued in tone, leaving this prerogative of gay colour to the flowers themselves.

CHAPTER IX

FIRING—GLOST

In Tudor days—"an oven was found in every garden. It was made of turf, with a roof of boughs and heated with charcoal. . . . The fires were lit on Friday, and the batches were taken from the ovens on Monday."

F. L. BOWMAN

GLOST KILN

The word "glost" is applied to glazed ware especially in connection with the firing of it. A potter speaks of firing a "glost kiln" which means one filled with glazed pots.

FILLING THE KILN

Care must be taken when filling a glost kiln not to allow the pots to touch either the muffle, shelves, or one another. Stilts with three sharp points on which to rest the pots to prevent them sticking to the shelves may be bought.

POWDERED FLINT

If there is any fear of the glaze running during the firing and dripping off the pot on to the shelf, the floor of the muffle and the shelves should be protected by putting a layer of powdered flint on to them before filling the kiln. This can be spread evenly by using a sugar sifter or gravy strainer, but care must be taken not to put flint on to the glazed pot, otherwise it will go dull and rough where the flint has been deposited upon it.

FIRING

The firing of the glost kiln is similar in principle to the biscuit kiln, but there is no longer any necessity, as far as the pots are concerned, to heat the kiln slowly at first. It is advisable, however,

for the sake of the muffle, not to go too quickly for the first half-hour.

A glost kiln takes about four hours to fire. A cone may be put in to show the temperature, but the progress of the firing may be observed if a few samples are placed in front of the kiln within easy access of one of the spyholes. These can be removed with a pair of tongs when the firing is nearing its height, and quickly cooled by dashing into a bucket of cold water.

Such samples are made by painting a few broken pieces of biscuit ware with black under-glaze paint, and putting transparent glaze over this. The painted marks will be seen to be black and shining when the kiln is fired, but grey and milky in appearance if the glaze is not sufficiently melted.

This method of course only applies when all the other glazes used in the firing are either made from transparent glaze or need an equal temperature for their firing.

An experienced potter can tell the temperature by the colour of the heat. When the heat shows first in the muffle it is dull red or rose-colour, then what is known as "cherry", which is somewhat of the tint of the yellow-white in a white heart cherry. It is first dull "cherry" and afterwards light "cherry", then it is usually at the height of the required temperature for most school purposes.

The samples may therefore remain in the kiln until it has reached dull "cherry" heat before there is any need to take a test, or any danger of over-firing.

When a glost kiln is unpacked the flint should be brushed off the shelves to be used again, but if drops of hardened glaze are amongst it these must be sieved out together with any other impurities.

If a shelf gets glaze upon it, then flint should be placed over the glaze at the next firing. This flint melts in with the glaze and makes it possible, with care, to chip off the mixture when it is cool, and so clean the shelf.

In firing glazes it is important to fire in the same kiln those needing the same temperature, as some colours are ruined by too great a heat whilst other glazes are infusible at a lower temperature.

CHAPTER X

DECORATION

"It is only through the morning gate of the beautiful that you can penetrate into the realm of knowledge. That which we feel here as beauty, we shall know one day as truth."

SCHILLER

"Have bright ideas and the longing to express them will flow freely."

VOYSEY

One of the aims of the potter should be to make good pottery. Form and shape are of the first importance in beautiful pottery. Any decoration, whether in the form of handles, feet, or pattern, should add a further dignity and beauty, otherwise the pottery is better without it.

As a rule it may be said that simplicity, coupled with an understanding of the medium in which one is at work, and fitness for purpose underlie all good shapes. In fact the first aim of the student should be to make a beautiful shaped pot (including handles and feet, spout and lid), and glaze it with a good glaze, before any attempt at painted or modelled decoration is made.

When speaking to children about additions that can be made to pots it is well to show them good examples of handles and feet and point out the fact that these do not detract from the original form. Some shapes are strengthened in their form by the line of the handle or foot.

A jug should pour well, stand firmly, and have a strong handle which can easily be grasped. A good spout should turn over slightly at the top, otherwise it will dribble. The jug must not have a trough inside where stale milk can lodge and so prevent it from being easily cleaned. A jug made in a mould may do this: made on a wheel, this fault would be avoided.

When we have the shape correct, we can proceed to the decoration. There is much varied opinion with regard to decoration. In these days of printed transfers, much bad and unsuitable pattern is shown in shops and stores and its poor standard is sure to influence children. It is therefore necessary to consider with them the fundamentals of decoration.

It is true that Nature is the greatest school. In Nature study lessons children learn to observe form in shells, flowers, fruits, but it will be found that it is never by a direct imitation of Nature (the inimitable!) that the best design is made. It is the emblem of each thing in Nature, *i.e.* what each beautiful natural object stands for to them—that they must bring forth as design. The pot itself and its technique must also influence them, and out of the unity of the two, blending into one harmony, will come perfect design. On the way to perfection, however distant the goal, we must remember that it is the child's mode of expression, no matter how crude, that we should encourage, because it comes from the life within.

As in days gone by, when the potter sought to express himself by his pottery, to express something about life as he knew it, so the child today seeks to express his ideas, and it is well if the teacher encourage this innate desire. Then the design will be spontaneous and the result prove interesting and vital instead of a dead copying of form without meaning.

The first form of pottery decoration was the result of the earliest method of making pottery in baskets. First a basket was made to hold water and afterwards the basket was used as a mould. Thus the impress of the basket was left upon the clay and the rough surface of the pot appeared to have a pattern of weaving scratched into it, as shown in Plate 16A, page 67.

SCRATCHED PATTERNS

The outsides of pots having been smoothed with a piece of bamboo cane, or skin, patterns of simple lines with bones, twigs or other natural implements were incised. Some of these patterns were made with finger nails.

Bands of plaited grass or string were wound round and pressed

into the soft unbaked pot to decorate it with horizontal bands. On other pots we find small projections at regular intervals pressed out from within.

Should a high finish be required or the colour need changing in parts, a thin wash of naturally coloured clay was put on and then the pot was polished with a string of small shiny seeds. This polishing was used before the invention of glaze.

INCISED LINES

After the invention of glaze the incised form of decoration was used and the sunk lines filled in with another coloured clay, Plate 16B. Later it was left for the glaze to settle into the incised pattern and the extra thickness of glaze gave a pattern of darker colour.

SGRAFFITO

In districts where red or yellow clay was found but creamy-white clay was scarce, "sgraffito" or scratched decoration arose. The body of the pot or tile was made in red clay, and then dipped in the cream-coloured slip. On this the pattern was drawn when the slip was sufficiently dry, and the pattern, or its background, was scratched away to show the red clay body (see Plate 17A, page 68).

SLIP DECORATION

Besides the use of slip in sgraffito work, it is often painted on as a decoration, Plate 18A and B, page 69; Plate 19A and B, page 70; Plate 20, page 79. Much peasant pottery is done in this way, the old English Toft ware being one example.

There is one point to remember. Red clay often fires at a lower temperature than white; and in using slip the two clays must be made to contract equally, otherwise the slip will chip off. Add calcined flint to the red clay and felspar to the white until they contract equally. This must be arrived at through experiments.

The ground on which the slip is applied must be damp. Likewise the pots or tiles must not be dry on which sgraffito work is done and they must be kept damp until the pattern is finished. If,

in spite of precaution, the work is found to be getting so dry that the edges chip as the pattern is scratched away, it may be gently moistened, either with a camel-hair brush or by spraying lightly with water.

UNDERGLAZE AND PAINTING

When the decoration is completed and the pot or tile is dry, it is fired and may then be glazed with either a plain or coloured glaze. Another way to enrich with pattern is by painting upon the "biscuit" or once fired pot or tile. To do this it is necessary to buy some underglaze colours.

It is economical of material and provides good training for the pupils if the range of colours is restricted to a few good bright tints such as blue, yellow, red, orange, green, black, terra-cotta.

Hundreds of shades may be obtained from those who stock pottery requisites. These are interesting to an individual worker, but the simpler the range for school use the better.

Pottery in its "biscuit" state should be kept very clean because if the slightest grease gets on it the glaze will not stick, therefore precautions against dirt should be taken. "Biscuit" should be handled with very clean hands.

If pottery is lightly fired it will be more difficult to paint upon as the dry biscuit will suck the moisture out of the brush. Such pots can be painted over with Gum Tragacanth (for recipe see end of book), though it has been found sufficient to dip the pot in water, just before painting, and thus prevent suction. With a hard-fired pot this difficulty does not arise.

MEDIUM

Several mediums can be used to mix the paints which are in powder form, but it has been found practical for school use to discard all but one, *i.e.* gum arabic.

This can be bought from any chemist. It should be dissolved in boiling water before using (for recipe see end of book).

If gum arabic is used as a medium it eliminates an extra firing known as "hardening-on." This word is deceptive, because the

firing burns away the fatty medium only and makes the colour loose, necessitating great care in glazing. So the process seems unsuitable for a school class besides adding to the expense of firing.

MIXING UNDERGLAZE PAINT

Some white, glazed tiles, brushes and a palette knife are also needed. To mix underglaze paint take a small quantity of the powdery colour on a tile, add about the same quantity of the gum and mix well together with the palette knife to a *stiff* paste. Thin with water and mix until all grains of colour are dissolved and a very smooth colour is obtained. More water can be mixed with it until sufficiently thin for use. The gum is merely the medium for fixing the paint securely to the pottery to enable the student to handle the pot without it rubbing off before the glaze is put on. If too little gum is used the paint is inclined to come off and the pattern will get blurred through handling. On the other hand too much gum makes the paint peel off even under the glaze.

It has been found best to glaze the inside of the pot before painting outside. If it is done after the painting the glaze is apt to trickle over the pattern and, where a coloured glaze is used inside, to spoil part of it. Also the inside being glazed, its moisture overcomes the need to stop any porosity or suction before painting. (See chapter on Glazing.)

After the pot is painted it is ready for glazing as soon as the pot itself is quite dry.

DESIGN

All the most interesting designs for pottery are painted freely and spontaneously, and when designing for pottery it is well to draw with brush and colour using pencil only for the spacing.

So often designs worked out in the pottery class with too great timidity are more suitable for the embroidery class; the first fresh paintings of children are admirably suitable, and the same spirit needs encouraging in the older classes. Plates 21, 22 and 23 (pages 80, 81 and 82) are fine examples of such freedom and delight in expression through the medium of the brush.

The frontispiece, Plate 1, shows a design any child today would be capable of producing. Plates 24 and 25 (pages 91 and 92) show simple treatment in modern pottery—Ravenscourt Pottery—by request.

ENAMEL OR OVERGLAZE PAINTING

There is another way of painting which is usually known as “overglaze”, enamel or china painting. In this the pot is already glazed and the colours used are different.

Some enamel colours should be bought, and the best medium for using with these colours is glycerine, thinning it down with water, using the same proportions of glycerine to water as gum and water in underglazing.

Painting overglaze resembles painting in oil colour rather than water colour. Special pencils can be bought which will mark upon glaze (and fire away afterwards without leaving any trace) and may be used to help in getting the design on to the pot, but the brush work should not be hampered by the pencil marks.

For this way of painting it is well to buy only those colours which will fire at the same temperature. Some colour schemes in china painting are achieved through a series of firings, the hardest colour being fired first and longest and so on, but in dealing with classes for simple pottery it is quite easy to select a few interesting colours which will all fire at one temperature. Plate 17B (page 68) is an example of overglaze or enamel painting.

LUSTRE

Lustre work is best dealt with by the individual student potter: it is hardly suitable for schools.

For the same reason stanniferous painting (*i.e.* painting on tin glaze before firing) has not been touched upon, requiring as it does so much more individual attention.

MODELLED RELIEF

Modelling in low relief is another form of decoration. The modelling produces an interesting effect when glazed in a coloured

glaze, for parts in low relief show a greater depth of colour. The relief may either be added to the work when leather-dry and modelled with the help of a modelling tool, or the work may purposely be made a little thicker than usual and ground cut away to form relief.

CHAPTER XI

MOULD MAKING

Education: The ability to do what ought to be done, when it ought to be done, irrespective of whether we feel inclined to do it or not.

HUXLEY

The reason for making moulds is to save time in making several articles all alike, especially those articles which cannot be repeatedly made on the wheel, such as figures, hexagonal or square bowls and dishes, etc., etc.

Before enough skill is acquired upon the wheel students may be allowed to make and use moulds, but the limitations of moulds should be pointed out. The pottery industries of today are suffering from the substitution of mould-making methods for hand-thrown pots and so have developed mechanical shapes, a state of affairs which would never have arisen if the wheel had retained its rightful place.

The fact that lesser skilled workers can manipulate the moulds induces factories to employ this method, but it largely accounts for much that is dead in the pottery of today. Where the wheel is used, as it is in a few factories, the pottery is living and vital and well worth studying. Natural moulds are useful in teaching to aid in the early stages of learning pottery.

NATURAL MOULDS

One of the most primitive moulds for pottery was a basket, or a hole made in the ground in the shape of the desired pot. This was lined with matting and the clay then pressed well into it and shaped. After having been left to dry and shrink the clay was taken out of the hole. In teaching pottery first to children it is advisable to use

some such simple natural mould into which they may either coil or press the clay. Half the skin of a grape fruit, orange or lemon, half a cocoanut shell, a cheap strawberry basket, or flower-pot saucer, are all useful for such moulds.

Where fruit skins shrink equally with the clay they can be fired away, when dry, in the furnace, but the pot will easily leave a cocoanut shell or basket because the clay shrinks.

PLASTER OF PARIS

The moulds generally used by potters are made of fine plaster of Paris. Plaster may sometimes be bought from an ironmonger. It must be kept airtight or it loses its power of setting firmly and so becomes useless. The finest grade, as used by dentists, is the kind needed for potters' moulds.

TO MAKE A MOULD

The very simplest form of mould is that made from a bowl, the shape of which has no part undercut, that is, it must have no hollow parts which would prevent it being removed from the mould when dry.

Take a smooth board, or part of a table, and make damp with water. (The board must be horizontal.) Fill the selected bowl with clay in order that there may be no air inside to force it up when the plaster is poured around it, and also clay-wash the outside of the bowl. Turn the bowl over on to the board.

Make four walls around it either of boards or tiles, at a distance of about 1 in. from the bowl's rim. If bricks are handy, place one as support outside each wall and cement joints at the corners with clay, thus making a watertight compartment in which to pour the liquid plaster over the inverted bowl. See that the walls inside are also damp. Then mix the plaster as mentioned at the end of Chapter II, taking the precautions mentioned there.

Mark a line on the side walls an inch above the bottom of the bowl, then pour in the well-mixed plaster. Pour as gently as possible because the mould must be without bubbles. In about

thirty minutes the plaster will have set hard enough to enable the walls to be removed and the edges of the mould trimmed. The mould with the bowl inside must be well dried in a warm place. A few hours must elapse before the bowl can be taken from the mould. When removing the bowl from the mould it may come

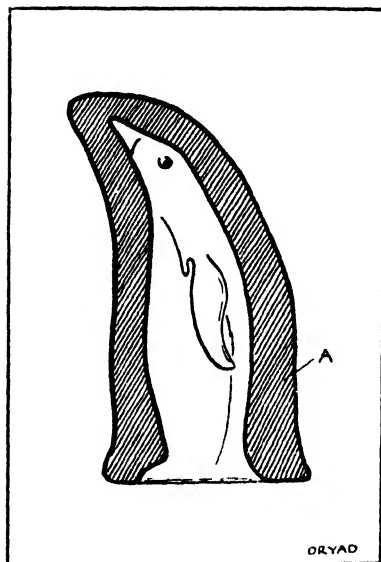


FIG. XI

A. Band of clay

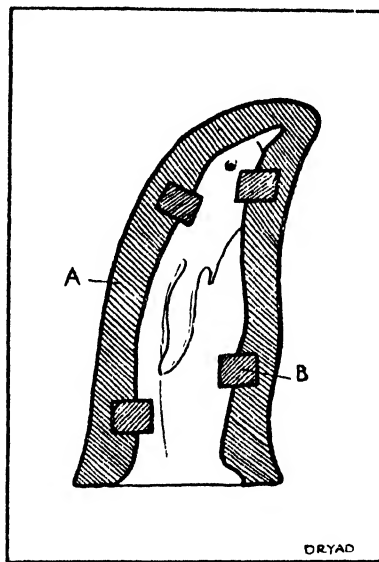


FIG. XII

A. Band of clay

B. Clay strut to support clay band from the back

away more easily if the dry mould is put under a tap and water run over it until it penetrates to the clay wash which coats the bowl, and loosens it. When the bowl comes away the plaster mould can be sponged clean from any clay-wash that may have come off the bowl. Put the mould again to dry. When it is thoroughly dry it is porous and ready for use.

The method of making in the mould will be described in Chapter XII on Casting.

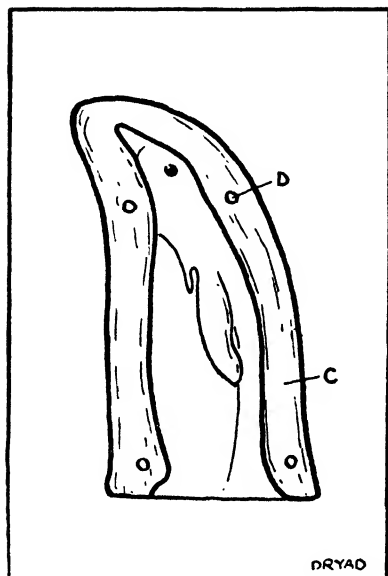


FIG. XIII

- C. Plaster of first section
- D. Hollow in which to key the second section

If the shape from which the mould is made is not simple and straightforward it may be necessary to make it in two, three or more parts. When determining how many parts will be necessary it must be remembered that each part must leave the mould easily without binding on any undercutting.

When the extent and shape of the first section of the mould are fixed a band of clay $\frac{1}{2}$ in. or $\frac{3}{4}$ in. is made from flattening out a roll and erect it around the part to be first cast. This band determines the thickness of the mould, see Figs. XI and XII. Clay-wash the shape and proceed to mix enough plaster for that section. The part

should be so placed that the plaster may be poured into it easily.

Directly the plaster is set, the clay band may be removed. This first piece of mould should be allowed to dry quite hard before proceeding, see Fig. XIII. Where time is pressing get it as dry as you can. Clay-wash the thickness of the first piece of mould after having scooped one or two or more holes in it with a gradual hollow and no undercut, and proceed to erect the clay band around all sides of the next section but the one that is formed by the first piece of mould, clay-wash the plaster of first section, mix and pour in plaster for the second section, and so on until the sections of the mould are made.

For figures, creatures and complicated forms where it is necessary to make the mould in many pieces, a further mould enclosing

all the pieces is often made, see Fig. XIV. This is made when all sections are complete. The outside shape formed by the combined sections of the mould should be as simple as possible and not undercut. This should be clay-washed. Then proceed, as with

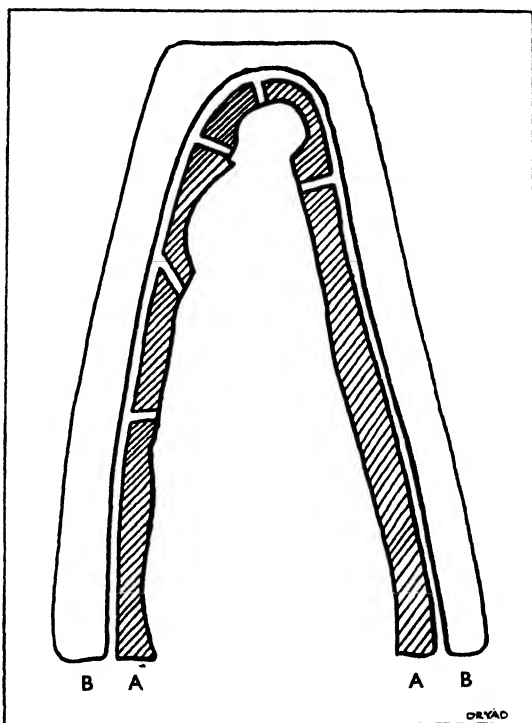


FIG. XIV

- A. Plaster sections of mould
- B. Covering mould of plaster

the simple bowl mould, to clay-wash or damp the table (or board) on which it stands, erect walls, etc., determine the depth of the mould on the walls, mix plaster, and pour in.

This covering mould serves to hold the many sections together in one whole when casting.

CHAPTER XII

CASTING

*"No art can with our handicraft compare
For pots are made of what we potters are."*

ANON.

CASTING

Casting is the act of making in a mould; in this connection it is one way of making a pot.

Having made a plaster mould as described in Chapter XI, before proceeding to cast a pot have sufficient slip ready (see Chapter II), and the mould absolutely dry and porous. Take a jug full of slip and pour into the mould up to the brim. Because the plaster mould is porous it will absorb the water from the slip and leave a deposit of clay on the inside of the mould. Whilst this is happening the slip sinks from the opening of the mould. Pour in more slip and, watching the sinking, keep it filled to the brim. In about five or ten minutes scrape away the overflow at the mouth of the mould when it will be seen how thick the deposit has become. If thick enough for the pot, pour away all slip that is liquid and not deposited upon the inside of the mould. Allow the mould to drain for a few moments. This is generally done by placing two sticks across a basin or jug and resting the inverted mould upon it. In a few minutes the mould should be turned back into its normal position. Clear the opening of all overflow of clay, and taking a penknife run it in lightly between the mould and the deposit of clay at the top to be quite sure all is loose and ready to dry. The clay deposit will contract as it dries and come free from the mould. When dry remove the plaster mould and release the pot which has taken on the shape of the mould. Should the mould be made in pieces there will be a line of clay standing out on the pot where

the pieces of mould join each other. This line must be cut away when the pot is sufficiently hard to be handled, and all rough and sharp edges finally rounded off with a damp sponge.

Afterwards set the pot aside in a warm place to dry before firing.

PRESSING

Another way to make pottery is as follows. Prepare clay as described in Chapter IV for slabwork: dust flint on each part of the mould and cut out a piece or pieces large enough for the mould or parts of the mould, and press into the mould very gently with a damp sponge. Where the mould is made in several pieces enclosed in a case, in short, the kind of mould known as a piece-mould, cut and fill in each piece separately, taking care to roughen the edges and paint over them with slip before assembling them within the casing.

After this is done press the parts together inside the mould with the finger or a modelling tool. Because the flint and also the clay is less moist than slip, the mould can usually be taken off at once. This way is therefore quicker than casting in slip where the mould must usually be left for a day before it can be taken off.

GLOSSARY

Arabic. A gum arabic, used as a medium for fixing paint on biscuit before glazing.

Asbestos Cement. Used for stopping up the crevices between doors and the furnace whilst firing.

Ball Clay. Very plastic clay found in Devon and Dorset. Used with flint, stone, felspar or whiting to form earthenware.

Biscuit. The name applied to pottery after being fired once.

Casting. Making pottery in moulds.

Ceramic. From Greek *keramos*=potter's earth, pertaining to pottery.

China. The name for porcelain because it was first brought from China.

China Clay. Also known as Kaolin (from Chinese *Kao-ling*, the name of a hill where a quantity is found). It is a fine clay used with China stone and other ingredients to form the body of porcelain.

China Stone. A stone which when ground is used to give translucency to porcelain and also forms part of the foundation of some glazes.

Clay. Soft tenacious plastic earth out of which pottery is made.

Enamel Colours. See Overglaze Colours.

Faience. Glazed ware originally made at Faenza in Italy, from which the French derived their knowledge of glazed pottery and so gave it the name of Faience.

Felspar. A fusible rock used to reduce refractory clays.

Fictile. Moulded or mouldable into form by the potter, from the Latin *finco*, *fictum*=to form.

Fireclay. A hard refractory clay used for sanitary ware, lining furnaces, glazed bricks, etc.

Flint. A variety of quartz consisting mainly of silica, used for preventing clay from sticking to boards in some circumstances, for dusting over kiln shelves to prevent the glaze from adhering and for making some clays more refractory.

Glost or glazed. Usually used in connection with the furnace, *i.e.* a glost kiln is a kiln packed with glazed pots.

Kaolin. See China Clay.

Kiln. The word usually used for a pottery furnace.

Majolica or maiolica. Originally meant pottery from the Isle of Majorca.

Muffle. The word used for the inner lining of a furnace, to prevent the flames from reaching the pots.

Mould. A hollow shape made in plaster, in which a pot may be made.

Overglaze Colours. Pottery colours used for painting on already glazed pottery.

Oxides. Used for colouring glazes.

Plaster of Paris. A composition of gypsum used for making pottery moulds.

Porcelain. The name given to a hard translucent ware. The name derives its origin from the word "porcella" which is the name of a shell resembling a little pig (from Latin *porcus*= a pig). Porcelain has the texture and appearance of this delicate shell.

Pottery. From Latin *potare*=to drink. *Potarium*=a drinking vessel.

Reducing. The reaction that takes place in glazes when a gas containing carbon is introduced into a kiln during the process of firing. Lustre may be obtained in this way.

Refractory. Hard, fusible.

Saddles are made of refractory clay for supporting and separating ware during firing.

Sgraffito or scratched work. A coloured slip placed over red clay, or *vice versa*, when part is scratched away to show the clay beneath the slip and so form a pattern.

Slip. Clay mixed with water to a creamy state, and put through a sieve. It is used for casting, slip decoration, sgraffito work, etc.

Stanniferous. Containing or affording tin (from Latin *stannum*=tin, *fero*=I bear).

Stilts are used for the same purpose as saddles but differ in shape.

Throwing. The art of making pots on a potter's wheel.

Tin. Oxide of tin is used to give opacity to glazes.

Tragacanth. A plant which gives a yellow gum, used for making biscuit non-porous before painting on it.

Translucency. Letting light through.

Underglaze Colours. Pottery colours used for painting before the glaze is put on. The painting may be either on the "green" ware or on the biscuit.

Vitrification. Becoming glass-like in character.

Wedging. The method of preparing clay by banging it, to expel air and make it consistently plastic.

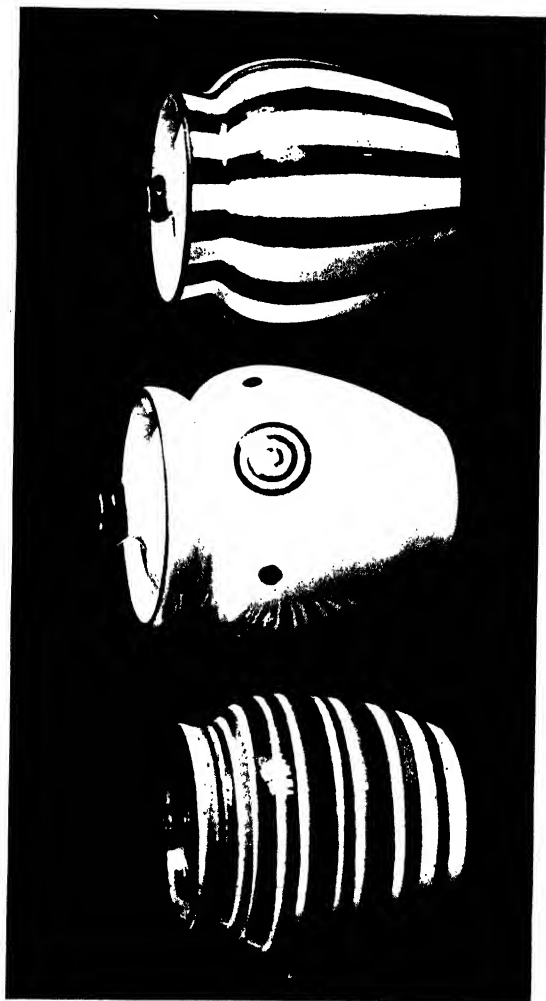
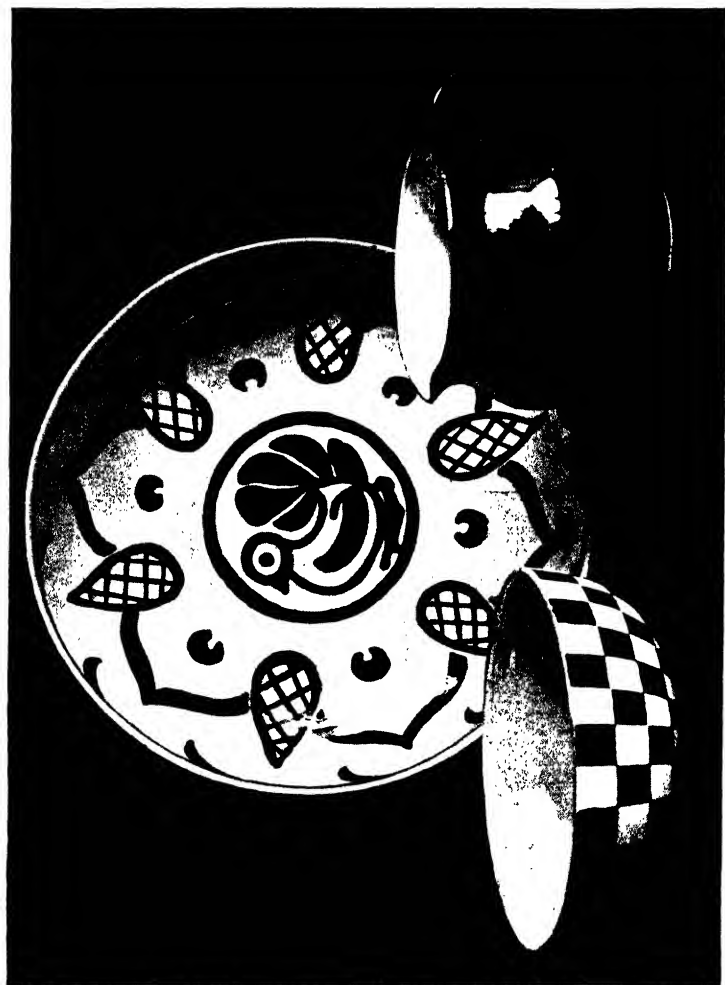


PLATE 24. Ravenscourt pottery; examples of the author's own work showing simple treatment in modern pottery design



Pl. vte. 3 - Ravencourt pottery: examples of the author's own work showing

RECIPES

GUM TRAGACANTH

Tragacanth is a thorny plant growing in Greece, Africa and the East, which yields the yellowish gum named from it.

This gum is used to prepare biscuit like a canvas or parchment, making the surface non-porous and easy to paint.

40 grains (2 scruples) gum tragacanth
3 oz. alcohol
1 pt. warm water.

Soak the gum in a little of the warm water, add the alcohol and grind all to a thin paste. Then stir into it the remainder of the pint of warm water.

Gum Arabic

1 oz. gum arabic, dissolve in
 $\frac{1}{2}$ pt. warm water
1 or 2 drops of oil of cloves to prevent it
from becoming mouldy.

BODIES AND PASTES

Old Majolica Paste

260 parts red clay
72 parts common clay
10 parts flint.

Parian Paste

11 parts Cornish stone
10 parts felspar
8 parts china clay.

Paste (to fire at a low temperature)

16 parts damp clay
4 parts whiting.

To make red and cream clay contract evenly try:

50 parts cream c.c. clay/50 parts red clay
5 parts ground felspar/5 parts ground flint.

RAW GLAZES

Opaque White Glaze

To 1 lb. transparent glaze
2 oz. oxide of tin.

Dutch Green

40 oz. transparent glaze
3 oz. black oxide of copper
 $\frac{1}{2}$ oz. red oxide of iron.

Indian Orange

$1\frac{1}{2}$ lb. transparent glaze
2 oz. red oxide of iron
 $2\frac{1}{2}$ oz. raw oxide of zinc.

Blue

1 lb. transparent glaze
1 oz. black oxide of cobalt
 $1\frac{1}{2}$ oz. raw oxide of zinc.

Lead Glaze

40 parts lead
20 parts China stone
5 parts flint.

Matt Glaze

12 oz. lead
 $4\frac{1}{2}$ oz. China clay
4 oz. zinc.

Black Glaze

1 lb. glaze
2 oz. strong black glaze stain.

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